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# USSR Report

CONSTRUCTION AND EQUIPMENT

No. 78



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26 November 1982

# USSR REPORT

## CONSTRUCTION AND EQUIPMENT

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## CONSTRUCTION PLANNING AND ECONOMICS

### MOSCOW CITY PLANNING SHORTCOMINGS DETAILED

Moscow STROITEL'STVO I ARKHITEKTURA MOSKVY in Russian No 4, Apr 82 (signed to press 2 Apr 82) pp 5-7

[Article by GlavUKS technical administration deputy chief S. Rumanov: "A Substantiated Base for Planning"]

[Text] The CPSU Central Committee and USSR Council of Ministers Decree "On Steps to Further Improve Estimate-Planning Work" emphasized that planning-surveying work and plan development must be planned and done in coordination with capital construction plans. Their basis must be plans for developing and siting branches of the national economy and industry and plans for developing and deploying productive forces by economic region and union republic. These plans must be worked out for at least 15 years into the future and must be refined every five years. Along with defining which enterprises and facilities must be planned and built in the calculation period, these plans must define their basic technical-economic indicators. A substantiated base is created which enables us to define a list of industrial construction projects for the five-year period and subsequent years and to draw up planning-surveying work plans.

Preparing such a base for drawing up planning-surveying work plans for housing and civil construction connected with building up a city is more complicated.

It is known that capital construction is done in a city on the basis of a general plan, five-year plans for siting housing, civil and municipal-services construction and plans for the detailed layout of housing regions, which are approved in the established order.

The general plan determines prospects for city development for the calculation period and, consequently, provides an opportunity for establishing construction tempos in the city. In turn, the plans for siting housing, civil and municipal-services construction determine the sequence for utilizing city sites to build up the city in the five-year period being planned and in the first year of the next five-year plan.

The five-year siting plans must be working documents for agencies planning capital construction in the city, the Moscow GlavAPU [Main Architectural Planning Administration], planning-surveying organizations and clients. Plans for the detailed layout of housing regions to be part of new development are worked out

on their basis; they are also used to set aside plots of land for organizing surveying work and for working out plans for housing developments, housing and public buildings, utility lines and facilities.

The five-year siting plans and PDP [detailed layout plans] for housing regions are the preplan stage, and schedules for developing technical documentation, the quality of that documentation and the effectiveness with which it is used for capital construction will depend on the quality of those plans and the promptness with which they are drawn up.

The Moscow City Soviet ispolkom has decided, regarding the changeover to two-year continuous planning of the design, construction and start-up of housing, municipal-services, cultural and personal-services projects, that:

PDP for large-scale construction regions and development land set-asides are to be done within three years of the start of construction and that surveying, the development of new microregion development plans, the production of technical documentation for city utilities lines and engineering preparation of sites, and the development of plans for housing and cultural and personal-services projects must be done within two years of the start of construction.

All this will be possible only if the five-year plans for siting housing, civil and municipal-services construction have been worked out and approved within four years prior to the five-year period being planned (since these plans determine build-up of sites for five years and for the first year of the next five-year plan).

It should be stated that this demand is not being met. The siting plan is being produced very late, two years late for the 11th Five-Year Plan. Hence, the development of PDP's is displaced in terms of time and surveying and the development of working plans for housing microregion developments is basically being planned for release in the first half of the year preceding the start of construction. All this leads to a situation in which we had succeeded in working out that portion of the plan being approved prior to 1 July, but release of the working documentation and its approval were done in July-September. The client has practically no time for verifying the completeness of the documentation he is receiving (and he should be given 45 days for this). As a result, established schedules for transmitting technical documentation from the client to contractor construction-installation organizations are not being met. And the client pays considerable fines because of this: 393,000 rubles in 1981.

It is clear from the above that city planning cannot be improved without improving the mechanism for planning and organizing the preplan stage connected with design and construction. The necessity of paying more attention to organizing the preplan stage requires the creation of a precise system for carrying it out and monitoring it. This would provide an opportunity to avoid the production of "throw-away" expenditures on planning, to organize the work of designers, experts and the client in a planned manner and ensure the release of high-quality estimate-planning documentation within the established time periods.

The Moscow City Soviet ispolkom resolution "On the 1982 Plan for the Comprehensive Economic and Social Development of Moscow" obligates the Moscow GlavAPU to prepare a draft plan for siting housing, cultural, personal- and municipal-

services construction in the 12th Five-Year Plan and to submit it for review in the third quarter of 1982. It must have been approved no later than the first half of 1983 and must be realistically coordinated with the opportunities for engineering site preparation, transport services to the population in new construction regions, the capital investments being allocated and the capacity of contractor construction-installation organizations.

Along with drawing up comprehensive schedules for development, expert appraisal and approval of technical documentation, the time has now arrived for working out comprehensive schedules for doing preplan work and promptly approving them in the Moscow City Soviet ispolkom.

This will obviously require additional limits on the development of layout documentation, but these questions must be resolved promptly.

One important link in organizing planning preparation work is the work of the Moscow City ispolkom commission on distributing nonhousing premises in the first floors of housing and separate cultural and personal-services buildings. The determination of what cultural and personal services will be located in what housing depends on the promptness with which this work is done. Lacking this, we cannot properly draw up an assignment on planning or determine in the titles lists the time necessary for planning or housing technical-economic indicators.

There is another aspect to this problem. Designating built-in and add-on premises in the first floors of housing as an individual decision in each separate instance leads to serious difficulties for designers and builders. In spite of the complexities, we need to work out standard resolutions applicable to series housing regarding a group of specified premises for cultural and personal services. This will permit not only a reduction in planning schedules, but also higher-quality construction and promptness in putting such premises into operation.

We have now determined the demands being made on a planning assignment. This assignment must become an important lever in improving quality and raising the technical and economic levels of planning resolutions. Clients and planning-surveying organizations need a carefully developed document of this type, and it must be coordinated with all the necessary organizations and approved promptly. This work must be organized in a planned manner and must be completed no later than one month prior to the start of the year the projects are included in the planning-surveying work plan.

The USSR Gosstroy has established that clients are obligated to transfer to the general designer, within 15 days of approval of the titles list of planning-surveying work, a copy of that list, determining by year the total work volume and the amount of planning output, as well as an approved assignment for the planning, attaching to it initial data and other materials established as being necessary to planning.

The USSR Stroybank is currently posing the question of having all planning-surveying work agreements prepared by planning-surveying organizations and released by the client to the financing bank by the start of the fiscal year or during the first months of that year.



Prompt resolution of the questions being examined at the preplan stage comprises a necessary base for preparing planning-surveying work plans. A necessary base, but not a sufficient one. In order to draw up a planning work plan for housing construction in future years, we need to have approved amounts of housing construction by design series for the five-year plan. And these amounts must be approved three years prior to the start of the five-year plan, since technical documentation for housing construction in the first year of the five-year plan must have already been worked out two years prior to the start of the five-year plan.

This fundamental planning document must also be stable, whereas in actuality this is by no means always the case.

It was only in June 1981 that the Moscow City Planning Commission informed the GlavUKS [Main Administration for Capital Construction] of preliminary amounts for the 11th Five-Year period, and the 1982 planning-surveying work plan for housing construction in 1983 (the third year of the 11th Five-Year Plan) was drawn up without an approved base. This is fraught with possible serious complications in future work. There have been instances in which refinements in work volumes by series for housing construction in the following year were reported in the planning year itself. And that is when we are to begin the period of "scientific" planning organization and "effective" use of previously developed technical documentation for housing construction, which must immediately be replanned for other series. A recent example. On 25 January of this year, the Moscow City Planning Commission reported refined amounts of housing construction, agreed to by industry, by housing series for 1983-1984. It became necessary during the remaining five months to work out and approve technical documentation for 150,000 square meters for series P 43/16 housing construction. Aside from the time lost, this required replanning the approved plan for building up microregion No 2 in Korovino-Funikov to put in new-series houses, as well as the replacement of high-rise buildings with 12-story housing in Strogina, on Novatorov Ulitsa, in Khord No 3 and in Zagor'ye. This seems to be quite natural, but it has a pernicious effect on the activity of designers, the client and the builders. It is a practice which should be eliminated.

Along with the PDP's for housing regions, the planning work plan for housing construction and the capital construction plan for the five-year plan must become the base for preparing planning-surveying plans for cultural, personal- and municipal-services construction in future years. There is currently a two-year form of drawing up planning-surveying work plans in effect. The time has come for the demands of improving the planning mechanism to lead us to the necessity of more carefully working out the second year of the planning work plan. Its refinement in the next year must be inconsequential in nature. Only on this condition will it become possible, first, to promptly work out the technical documentation to provide construction projects with utility lines and facilities and, second, to set aside plots of land and obtain specifications for connecting to utility lines and facilities only those projects whose construction in the near future is feasible. The latter is of great importance in eliminating putting the requirements of these projects for electricity, heat and water in reserve for long periods.

If the two-year housing construction planning work plan has been carefully worked out (which is possible on the condition that the preplan stage is carried out



promptly and given the availability of an approved, stable amount of housing construction by housing series), then conditions are present for a correct determination of cultural, personal- and municipal-services planning projects which will ensure comprehensiveness in the development of new housing microregions. To do this, we should use the capital investment limits being allocated (linked to contractor organization capacities) to determine the list of construction projects by branch of the city economy for the five-year plan (start-up) and stockpile projects for the first year of the next five-year plan. This construction-site list must be approved by the Moscow City Soviet ispolkom.

Only given the creation of a substantiated base for planning will a qualitative advance be possible in organizing planning, along with continued improvement in the mechanism for planning and administering the planning-construction conveyor in the city.

Time does not stand still! Unresolved questions in organizing the preplan stage and in preparing planning-surveying work plans and capital construction plans do not provide an opportunity for improving the quality and raising the technical-economic level of planning resolutions. At the same time, we must move ahead by solving the accumulated problems.

We have still not begun implementing the CPSU Central Committee and USSR Council of Ministers Decree "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Improving Production Efficiency and Work Quality" as it concerns the right granted to plan projects and housing-civil construction complexes on a competitive basis.

This provision is not reflected in the 1982-1983 planning work plans. At the same time, "Temporary Methods Instructions on Planning on a Competitive Basis" have been approved by the USSR Gosstroy in 1981.

The USSR Council of Ministers established in its 1981 Decree "On Steps to Increase the Effectiveness of Capital Investments Allocated for Housing Construction" that the planning, construction and acceptance of housing and public buildings in new housing microregions for operation must be done primarily in the form of finished city-development complexes beginning in 1983. The Gosgrazhdanstroy [State Committee for Civil Construction] has been instructed to work out and approve provisions on the city-development complex in the first half of 1982.

The city-development complex will become the basic target of capital investment planning in housing and civil construction. This will cause a certain restructuring of capital construction and planning-surveying planning.

The tasks life is putting forward demand a new style of work in which execution and discipline are integrally combined with bold initiative and enterprise, as CPSU Central Committee General Secretary L. I. Brezhnev noted in his speech at the 26th CPSU Congress. Only on this condition can improvement in capital construction in the city be achieved.

[captions to photos not reproduced for this report]

1. Housing on Trifonovskaya Ulitsa
2. New school buildings using standardized large-panel items
3. In northwestern Moscow
4. Khimki-Khovrino

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## CONSTRUCTION PLANNING AND ECONOMICS

### EXISTENCE OF TOO MANY CAPITAL CONSTRUCTION PROJECTS DISCUSSED

Moscow PRAVDA in Russian 13 May 82 p 2

[Article by A. Mitrofanov, doctor of economic sciences, professor, director, Scientific Research Institute of Economics of Construction, USSR Gosstroy: "Before Building"]

[Text] It is possible to have progressive plans for new construction projects, a developed production base and an effective system of worker stimulation. However, if in connection with this there is no real, balanced and continuously acting plan, capital construction cannot yield its maximum effect. At the 26th CPSU Congress it was pointed out that it is necessary to strengthen the requirements, on the one hand, for planning discipline, and on the other for the quality of the plans themselves and their soundness and validity.

To do this--to achieve a radical improvement in the style of administration in capital construction--is not a simple task. However, some improvements have already been made. Although in the 8th Five-Year Plan the actual time it took to build production projects in industry and agriculture exceeded the standardized periods by a factor of 2.1, in the 10th Five-Year Plan they were exceeded by a factor of only 1.4. This indicates that fewer construction projects were included in the plan and that more means were allocated to each one. However, there is still a great deal of work to be done. At the present time, an average of only 80 workers are assigned to a construction project of productive value, and only 5 workers per separate object. It is not easy to achieve high rates of construction under these circumstances.

As they say, however, trouble travels in packs. The fact of the matter is that all construction projects--and they number about 50 percent above the permissible norm--for enterprises and client ministries are "very important." When it comes time to hand out assignments, the distribution is made according to the principle "a thimbleful to each sister." And it turns out, for example, that for new projects in their first year of construction only 5-10 percent of the estimated cost is allocated, although it should be twice that amount. They do not get their proper share the next year, either. And when it comes time to begin operating, it turns out that the rest of the work will not be done for another year. The start is postponed. However, the output of the new capacities is expected in other places and has already been included in other plans. This is how disproportions appear in the national economy from time to time.

However, if we allocate means to new construction projects in scientifically substantiated amounts, someone's toes will have to be stepped on. Projects already under construction cannot be stopped, because getting them into operational use will make it possible to eliminate "bottlenecks" rapidly and achieve the increase in output that is needed right now. This means that upcoming projects must be deprived of their fair share of means. Here, again, we have a contradiction: this causes a disruption of the systematic development of different branches of the national economy.

Economics makes recommendations on how to distribute means. If, according to the norms, capacities must be built within 2 or 3 years, for example, then for the completion of projects already under construction it is advisable to allocate 35 or 20 percent of the annual amount of capital investments in the branch; for the formation of a reserve for projects already begun, 15 or 10 percent is needed. The remaining 50 (for a 2-year period) and 70 (for a 3-year period) percent of the resources must be directed at upcoming projects.

How can this be done? It appears that it is necessary to reduce the number of construction projects and objects in the plan by about one-third. This was the path followed in Leningrad during the 10th Five-Year plan. The number of construction projects was reduced by 35 percent, which made it possible to increase the allocation of means to each remaining project by more than 50 percent. Thanks to this radical planning method, the builders in Saratov succeeded in reducing their amount of incomplete work by almost 300 million rubles, thereby bringing it down to the standard level.

They also did it the state's way in Minstankoprom [Ministry of the Machine Tool and Tool Building Industry]. At the very beginning of the 10th Five-Year Plan the leaders of USSR Minstroyaterialov [Ministry of the Construction Materials Industry] reduced the number of construction projects listed in their plan. As a result, the remaining ones began to be put into operation more rapidly. Later on, however, these ministries again allowed some dissipation of resources.

This means that it is not always wise to rely only on the "conscientiousness" of departments. A unified policy is needed here. What is needed above all is a detailed and comprehensive inventory of construction and not just the formal list that USSR TsSU [Central Statistical Administration] compiles periodically. In other words, an analysis should be made: can the work on one construction project or another be completed in the proper year, or is it better to postpone it temporarily? It is precisely this approach to the matter that will be of assistance to economic and planning agencies in working out real and effective measures for the normalization of incomplete construction.

If this is not done, the excessively extensive front of capital work being done will hinder the introduction of the new order for planning and calculations in the branch that is being carried out in accordance with the resolution on improving the economic mechanism that was approved by the CPSU Central Committee and the USSR Council of Ministers.

The plan formulation process and the quality of the plans indicates that ministries and departments having small production reserves at existing enterprises sometimes receive overblown, unreal assignments for capital work. Even after the annual plans



are approved, numerous new projects are added to them. This is, perhaps, the very worst form of construction administration.

The scales of technical re-equipping and modernization of existing enterprises are unjustifiably small: only 2-3 percent per year of fixed capital in the productive sphere. As it turns out, the lion's share of the capital is spent on raising the walls of buildings every year, and there is no money left for replacing equipment (and this is the active part of the fixed capital).

The way out is to plan existing production and new construction as a unified whole and to allocate capital investments to ministries and departments not just in general and for new projects, but for a planned increase in output. Both propositions are only being given lip service right now, with no methodological and organizational solutions being proposed. It is important to change over, as rapidly as possible, from the plan for capital investments now being used to a plan for the reproduction of capacities and fixed capital that is organically related to the existing production apparatus and the utilization of available capacities and fixed capital.

In formulating plans, we grew accustomed to the indicator that characterizes the scales of expenditures for incomplete construction. This is understood to mean the cost of work finished on uncompleted projects, as a percentage of the total capital investments for the past year. At the beginning of the 11th Five-Year Plan, this indicator for state construction stood at 87 percent, whereas the norm was 65 percent. In the 9th Five-Year Plan, the corresponding figures were 75 and 60 percent. The present trend is clearly undesirable.

It appears that it is time to investigate this indicator. Little has been said about its economic content. As was correctly noted in the economic review "The Plan and the Construction Project" (PRAVDA, 8 February 1982), it is not directly related either to the number of construction projects in the plan, or to periods and the concentration of resources, or to the readiness for use of projects under construction. Finally, it is also not related to the branch's final output, which is the introduction into operation of capacities and fixed capital. It quite frequently happens that an increase in this indicator does not result in an increase in real projects in progress for the introduction of capacities and their readiness.

A reduction in the amount of incomplete work, on which economic practice is so firmly oriented, entails--on the contrary--a reduction in real projects in progress. Therefore, when evaluating the quality and pattern of implementation of plans in the branch, it would be advisable to give primary emphasis to fixed capital and projects in progress for the introduction of capacities and the degree of their readiness. As a control, we should also use the indicator of the remainder of the estimated limit; that is, the amount of work that must be done in order to complete what has been begun.

In view of the excessively developed work front, and also simply because of the inertia of management, the transition to a stable five-year plan will require a certain amount of time that, obviously, will be quite long. Therefore, in the transitional period it is necessary to make active use of the path indicated by practice itself: 2-year planning, following an experiment conducted by the Orlovskiy builders. This experiment has been approved by the CPSU Central Committee and is recommended for widespread use. However, it is not mandatory to use it in the presently adopted system for the planning of capital construction.



It appears that planning documents should be based completely on modeling and optimization conducted with the help of mathematical-economics methods and high-speed computer technology. This is particularly important for capital construction, since the use of such methods will eliminate (or, in any case, sharply limit) the making of arbitrary decisions in this important sphere of economic activity.

In order to make sure that everything emanates from real possibilities when formulating plans, it is necessary to have an inevitably acting obstructing mechanism that is in some way an exterior mechanism with respect to the plan. Stroybank [All-Union Bank for the Financing of Capital Investments] can and must play the role of this limiting agent. It is also necessary to have an effective system of penalties that would increase the responsibility of economic leaders and force them to deal with the dissipation of forces and means on an excessive number of construction projects.

Something must be said about the fact that questions concerning the planning of construction production work are now being worked on by institutes subordinate to USSR Gosstroy, whereas the problems involved in controlling the investment process for independent builders are being handled by institutes subordinate to USSR Gosplan, it being the case that the latter of these operates only on the level of the national economy. However, no one is concerned with control at the level of specific customers. Little is being done to improve deliveries of equipment. In a word, there is no scientifically substantiated, unified system for planning and control in capital construction. Gosplan, Gosstroy and the State Committee for Science and Technology should, obviously, direct the collectives of the scientific research institutes to create such a system.

No less radical measures are needed for the solution of other knotty problems. Among them is accelerating the rate and expanding the scales of the introduction of the achievements of scientific and technical progress for the practical reorganization of planning and estimating work. The structure and organizational forms of the administration of construction production work should be put in good order. However, the branch's first need is for real, strictly balanced, stable and continuously acting plans. In them we will find the basis for an improvement in the style of economic management in capital construction.

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## CONSTRUCTION PLANNING AND ECONOMICS

### EXECUTIVES DESCRIBE PROBLEMS WITH NEW MANAGEMENT SYSTEM IN CAPITAL CONSTRUCTION

Moscow STROITEL'NAYA GAZETA in Russian 16 Jun 82 p 2

[Article by A. Kuznetsov: "If We Change, Let's All Do It Together"]

[Text] Today at the editorial board's "round table" (organized on the basis of a questionnaire prepared by STROITEL'NAYA GAZETA's Department of Economics) we have four middle-level administrative executives from the construction industry: A. Starchenko, manager of USSR Minstroy's [Ministry of Construction] Trust-4 in Dzerzhinsk; O. Piskovskiy, manager of the Belorussian SSR Minpromstroy's [Ministry of Industrial Construction] Trust-14 in Gomel'; M. Dul'man, manager of the Lithuanian SSR Minstroy's "Vil'nyusstroy" trust; Ye. Trukhanovich, deputy manager of the Kazakh SSR Mintyazhstroy's [Ministry of Construction of Heavy Industry Enterprises] "Sokolovrudstroy" trust. On the agenda there is one main question: how successfully is the construction industry coping with the new methods for economic work stipulated in the well-known resolution of the CPSU Central Committee and the USSR Council of Ministers on improving the management mechanism?

The 3 years that have elapsed since the publication of the resolution on the new management methods were a time of continuation of economic experiments, theoretical developments and the accumulation of experience in working under the new methods. The necessity of increasing the customer's responsibility for the situation on a construction site has been realized. Confidence in the system of bank credit is getting stronger. The most effective variants for the normative distribution of profits under conditions of autonomous financing activity have been found in the practices of progressive construction organizations. The NChP [normative net production] and commodity construction output indicators are taking on ever more importance in the planning of construction production work. No one now argues with the position that a realistic and balanced construction plan should point both the general contractor and subcontractors not toward gross amounts of work, but toward the technologically sequential introduction into operational use of projects, sections and complexes under construction.

There are many positive examples of successful operation under the new methods. On the whole, however, the introduction of the new management methods is going slowly. Let us listen to some firsthand opinions about this.

A. Starchenko. We set our 1981 commodity construction output plan at the level of 56.5 million rubles, but actually did 72.5 million rubles' worth. The effect of the new management methods is, obviously, quite tangible. However, the previous

shortcomings are quite tenacious. The planners tell us to introduce capacities without allowing for construction time norms. The clients distribute the contract work limits by years without taking the norms for construction under way into consideration. We receive the list of projects only after a considerable delay.

Now, a word about "commodities." Although USSR Gosstroy notified all customers and planning institutes about the development of technical documentation with the addition of a report on commodity construction output on a timely basis, not one client has presented such a report. We determined the amount of finished commodities ourselves. The threat of fining clients in 1981 changed nothing. This year, only Gor'kovgrazhdanproyekt [Gorkiy Civil Design Trust] has added commodity construction output reports for projects of a residential, social, cultural or domestic nature. However, we have dozens of customers and just as many planning organizations to deal with.

I consider stage-by-stage commodity calculations with subcontractors to be incorrect. Why should they not participate in the final introduction of capacities if their participation is planned? Why must the general contractor carry all the weight?

And there is one final problem. The general contractor is given the plan without any stipulations. USSR Gosplan is inexorable. The plan is the law. But the subcontractors (in our case, subunits of USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work]) accept from us only real, documented--"X-rayed," as they say--work to do. But if part of the documentation is missing, and it is the client's fault? Then the subcontractor agrees only to the "X-rayed" part of the installation work. The general contractor can deal with the rest of it as he pleases.

I think that the subcontractor still has too little responsibility.

O. Piskovskiy. As an experiment, our trust in Gomel' has been reporting on commodity output for several years now. Last year, the plan for this indicator was only 90.2 percent fulfilled, but the year before that it was overfulfilled by 18 percent. There are many reasons for this unevenness. What upsets us most of all is the low profitability. Since 1975 it has been falling because of the significant increase in prices for many building materials and services and a change in the transportation system for the delivery of materials. We are waiting impatiently for 1984, when the estimated costs will be put in good order.

I agree that the customer's degree of responsibility is still too low. For example, a customer delays financing until April or May. No penalties are applied to him. But we, it turns out, have nothing with which to pay our workers.

The new form of management is not correlated with the team contract method, because the bank does not credit overfulfillment of the plan on projects that were begun in the preceding year and turned over in the present one. However, in order that they be turned over strictly according to plan, it is necessary to work ahead of schedule.

Our trust is preparing for the transition to normative conditionally pure output in 1984. However, without having yet introduced this method, we received a condition: if the labor productivity plan, as calculated by the new indicator, is not fulfilled,

the leaders will lose all their bonuses for the results of the quarter's work. Is that not just a little too thoughtless? It would be better at first, until some experience has been gained, to use encouragement to increase labor productivity and hold off on the penalties until later.

M. Dul'man. "Vil'nyusstroy" has been working under the new method for 5 years. The time for experimenting is past. This is the third year that we will be determining the results of our work for conditional net output. Getting used to this indicator is not easy. Although we achieved an increase of 1.2 million rubles in the amount of work we did last year, the plan for conditional net output was only 88.6 percent fulfilled. In return, incomplete construction was stabilized and even reduced by 14 percent. It now constitutes 67 percent of the year's plan for construction and installation work done by the trust.

Last year we released for operational use 90 projects with a commodity output of 50 million rubles, or 107 percent of our plan. Judge for yourselves: how does one combine the plan for commodity output with the plan for conditional net output? And are these two categories actually combinable?

Last year the trust paid the bank 290,000 rubles as interest for the use of credit. Generally speaking, this sum is still bearable. Nevertheless, right now it is difficult to estimate how "expensive" or "cheap" the new order of financing will be for builders. This is particularly true in view of the confusion that now exists in relation to estimates.

Right now, the planned accumulations are set at 6 percent, but both the scientists and the practical people have proven that for expanded reproduction these means are inadequate. According to our calculations, the minimum profitability of commodity construction output should be at least 12 percent. Only under these conditions will it be possible to implement measures for the strengthening of autonomous financing. Industrial enterprises, by the way, are allowed up to 20 percent profit in their goods calculations.

Unfortunately, the new management methods are interpreted differently in different areas of the construction business. Although commodity realization has become the basic and main indicator for general contracting and subcontracting organizations, the planners are just barely moving in this direction, whereas for the clients it is as if nothing has changed. All this is the result of the fact that the development of rules for contract agreements has been delayed. We builders are hoping that they will be issued quite soon. Under present conditions, if 2,000 rubles' worth of equipment is not delivered, the customer forfeits only 160 rubles. The contractor can suffer tens of thousands of rubles in penalties, thereby losing his bonus for putting a project into operational use.

The method of calculating the annual goal also needs improvement. Skillful management is now based on concentrating forces and means on projects already under construction. However, Stroybank [All-Union Bank for the Financing of Capital Investments], without trying to understand the essence of the matter, cuts off credit for projects under construction if the percent of SMR [expansion unknown] completion for projects being introduced is below the average percentage of completion of the administrative program. These actions on the part of the bank impair the working mechanism of the new management system. The most labor-intensive work remains to be



them on projects that are being introduced, and its value is only one-tenth that of material-intensive work. Why punish the builders?

Ye. Trukhanovich. Our "Sokolovrudstroy" trust worked better in 1981 than in the preceding year. However, I cannot say that this was because of the new management methods. Things just came out better.

The following question has still not been answered clearly: what should be the emphasis in the first plan--volume or finished output? Right now, workers and production leaders monitor the value of the volume indicator very closely. Commodity output is in second place. However, the theory of the new management methods must not be at odds with what is practiced.

Commentary by STROITEL'NAYA GAZETA's Department of Economics and Labor Organization. It seems to us that these leaders and specialists from four trusts have presented us with some timely thoughts on the problems involved in introducing the new management methods in the construction industry. They again mentioned the lack of interest on the part of customers and--for all practical purposes--the planners in introducing them. Their position on better suppliers of materials and equipment has not changed. Only contractors, subcontractors and the financing bank have begun to work according to the new order. The effect of the introduction of the new management mechanism is only half of what was expected.

The most important normative documents, which were to create a legally strong and effective system of economic relationships among all participants in the construction process, are still in the development stage. The first quarter of 1980 should have seen the publication of "Rules for Financing Capital Construction"; the third quarter--"Proposals for the Further Introduction of Team Contracts in Construction in 1981-1985"; the fourth quarter--"Changes and Supplements to Rules on Contract Agreements in Capital Construction," as well as "Changes and Supplements to the Regulations on Interrelationships Between General Contractors and Subcontracting Organizations."

It is in no way warranted that these basic documents for which the builders are waiting still do not exist. It is obvious that the previous system of uneven responsibility, in which the general contractor took the blame for many of the customer's omissions (including planning), still has many adherents.

Therefore, it is now more important than ever to exhibit practicality and persistence in order to give the new management principles a chance to work.

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## CONSTRUCTION PLANNING AND ECONOMICS

### NEW SYSTEM OF CREDIT DISCUSSED

Moscow ZHILISHCHNOYE I KOMMUNAL'NOYE KHOZYAYSTVO in Russian No 7, Jul 82  
(signed to press 7 Jul 82) pp 31-33

[Article by T.D. Molchanova, chief of the USSR Gosbank Board section: "Under New Planning Conditions"]

[Text] The CPSU TsK [Central Committee] and USSR Council of Ministers decree dated 12 July 1979 "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" defined the tasks and methods for improving the economic mechanism in construction that will provide a faster start up of production capacities and structures and improve the effectiveness of capital investments. The adoption of such valuable indices for economic activity and economic incentives for contract organizations, which are directly dependent on the final results of their work, should aid in meeting the goals that were outlined. One such index is the volume of construction commodity production which is determined on the basis of the estimated cost of construction and installation work for the enterprises, phases, starting complexes, or structures that have turned over to the client and are ready to turn out products or render services. An inter-departmental commission (MVK) under USSR Gosplan approved a resolution on 18 June 1981 which concerned the adoption of a construction commodity production index and other indices that were defined by the CPSU TsK and USSR Council of Ministers decree of 12 July 1979 for evaluating the activities of construction and repair organizations in the Ministry of Housing and Municipal Services system.

The transfer of a number of construction and repair organizations to the new system of planning which was done by the RSFSR Ministry of Housing and Municipal Services, produced the first positive results in matters of strengthening planning discipline in capital repair, in improving the standard and timely formation of plans for contract work and in providing construction and repair production with the necessary financial resources.

Naturally the transition to a new planning system requires that much serious preparation be done. It is necessary for one to direct attention to problems that are of a purely economic and financial nature, without solutions to which both the adoption of the construction commodity production index in capital repair work and the financial position of construction and repair organizations would be complicated. These are the status of accounts with clients for completed work, their

preparedness to transfer to the new accounting system, the kind of funds by means of which the production process will be carried out in construction and repair organizations and how effectively these funds will be used and what the economic effect is from this or that type of borrowed funds. The reasons why construction and repair organizations work practically throughout the entire calendar year, having extremely unfavorable financing conditions, also requires study.

At the present time construction and repair organizations in many cases do not have the funds to settle accounts with suppliers on time for the commodity stocks they have received. In such cases the Gosbank settles the accounts with the suppliers. Credit is constantly being granted in large sums to construction and repair organizations for these purposes. Organizations pay large sums for this type of credit from profits which often is not specified by financing plans. The interest rate is quite high--5 percent for a time loan and 10 percent if there are continuous credit obligations over the course of 60 days. And since construction and repair organizations do not have the possibility of paying off the credit on time then, when obtaining it in a substantial amount, they pay the bank 10 percent from their profits. In 1981, RSFSR construction and repair organizations had more than 20 million rubles in overdue obligations on the average every month. There is also indebtedness due to other financial obligations despite the Gosbank's substantial assistance in this problem. The overdue debt of construction and repair organizations according to reciprocal accounts with other economic agencies amounted to 70 million rubles on the average every month. Gosbank renders assistance chiefly to accounting agencies that have temporary financial difficulties. Enterprises that have unsatisfactory results in their production and financing activities and that do not settle their obligations on time over the course of a long period of time can be deprived of their right to obtain credit from Gosbank.

One of the objective reasons for the difficult financial situation under the conditions for implementing consolidated settlements for completed work is the lack of a continuous source of reimbursement for expenses that have been incurred. At the present time expenses for incomplete production are covered by means of personal circulating funds and by funds from clients that are enlisted for temporary use in the form of an advance. As a result a situation has developed whereby organizations practically have no funds to settle their own obligations during the course of the year, all of their payments either going to pay off a debt or being considerably late and their ability to make payments comes basically when they have a mass turnover of structures for use. This is associated with the fact that a substantial amount of the quotas of personal circulating capital is formed by means of borrowed funds that are part of their cash flow. Large sums of funds from clients, profits and other borrowed funds are considered to be the sources of forming the quota of personal circulating capital. The true nature of these sources, the validity of borrowed funds being part of the cash flow, and the length of time that they are in circulation requires special scrutiny and that necessary measures be taken to form circulating capital more rationally.

At the present time construction and repair organizations enlist the funds of clients in large amounts in the form of an advance--a substantial portion of which goes to form the quota of circulating capital. During a review of the possibility of a loan Gosbank considers both the availability of advances from clients and the quota

of personal circulating capital that has been established; as a result it turns out that a continuous source of reimbursement for expenses that have been incurred is lacking which must cause financial difficulties and a breach of payment discipline. In addition, enlisting advances from clients to complete contract work does not promote a solution to such problems, which were defined by the CPSU TsK and USSR Council of Ministers decree of 12 June 1979, as strengthening state and planning discipline and improving the effectiveness of using the state funds that are allocated toward the capital repair of fixed assets.

The decree made it obligatory for ministries and departments to discontinue enlisting funds from clients in the form of an advance during the transition of contractor organizations to settling accounts with clients based on the estimated cost of construction commodity production. The right of contractor organizations to enlist funds from clients in the form of an advance was no longer in force in 1982 since there is no corresponding permission from the USSR Council of Ministers.

A definition of the concept of construction commodity production in capital repair work is given in the record of the MVK under USSR Gosplan dated 18 June 1981; however, this is insufficient. It is necessary to establish a system to determine the composition and cost of construction commodity production in capital repair work analogous to that which has been established by USSR Gosstroy, the USSR Stroybank [Construction Bank] and the USSR Gosbank for new construction.

What are the basic principles in the credit interrelationships of Gosbank's institutions with construction and repair organizations that have been transferred to settling accounts with clients for completed work according to the estimated cost of construction commodity production?

One of them is a grant of credit by Gosbank to contractor organizations for incomplete construction by means of and within the limits of the clients' funds that have been freed in association with their transition to settling accounts without installment payments. Construction and repair organizations must carefully work out a plan for contract work with clients in order that by the beginning of the year being planned it will already be provided with structures for which financing can be initiated in the established periods of time. A delay in initiating financing for the structures under capital repair due to a lack of qualitative design and estimate documentation for them and sources of financing and less credit from Gosbank for reimbursing costs that have been incurred due to these reasons will significantly complicate the activity of the organizations and their financial position. The chief condition for strengthening state and planning discipline in capital repair work is the coordinated work of contractors and clients.

It is specified in Gosbank's instructions that expenses for the incomplete production that construction and repair organizations have are to be loaned over and above the quota of personal circulating capital—that is, the quota of personal circulating capital that is for incomplete construction is completely excluded from the actual expenses when determining the amount of credit. Along with this organizations should be given personal circulating capital for the expenses of incomplete production according to the established procedure and in the established amount while taking into consideration the consolidated settlements for the completed work.



These Gosbank regulations originate from the fact that in accordance with the systematic instructions for transferring construction and repair organizations to the new conditions of planning and economic incentive for construction production and the decree concerning measures for further improving the use and maintenance of the housing fund, organizations must have personal capital in their circulation in an amount that ensures their consolidated settlements for the completed work.

The next principle of extending credit for incomplete production is that a loan is granted for expenses that are estimated according to the actual cost but no greater than that which is planned which requires that budget discipline be observed. Otherwise financing difficulties can arise in particular both in the accounts for the wages of workers and with suppliers.

The two principles of extending credit to construction and repair organizations for incomplete production that were mentioned above differ from the procedure established for contractor construction and installation organizations whose existing quota of personal circulating capital for incomplete production is calculated only one time--at the end of the year--in an amount not exceeding 10 percent of the yearly program. This privilege was granted to construction and installation organizations to complete work in the period between the dates that credit is obtained which is done according to a new system two times in a month (the right of Gosbank to extend such credit was established by decree No 695). In addition to this, the value of the credit extended for incomplete production is the estimated cost of the expenses incurred. As a result construction and installation organizations have unrealized profit in their cash flow from Gosbank credit, which is considered to be a source of forming the quota of personal circulating capital.

It is necessary to establish a unified system of extending credit to contractor organizations--both construction and installation and construction and repair. The problem in question being a matter of principle for construction and installation organizations in forming circulating capital including the quota, cannot be solved by Gosbank alone. It requires a study on the part of the ministries of housing and municipal services and approval by the USSR Ministry of Finance.

Gosbank's control over the observance of planning discipline has been strengthened under the new system of extending credit to construction and repair organizations. Gosbank's lending institution must be presented with a list of the structures that are included in the plan and which have been accepted for financing which is checked with the corresponding data from clients. In this regard the initial plan for contract work must be stable. Repeated changes in it during the course of the year is not permissible under the new conditions.

When differential rates are used for the payment of a loan for incomplete production the Gosbank institution is initially guided by the established timetable. If the capital repair work for a structure is not completed on time and the timetable is extended according to the established procedure the structure is considered to be delayed in being turned over for use. In this instance two percentage rates are used for a loan--0.5 percent for the expenses that were incurred before the original deadline when the structure was to be turned over for use and 4 percent for the loan for expenses that were incurred after this deadline had run out. Under the conditions

for settling accounts for construction commodity production the Gosbank extends credit for the expenses for the structures under capital repair until the work is totally completed at the planned structure irrespective of whether the planned timetable was observed or breached.

Ways of strengthening planning discipline in capital repair work, establishing and observing timetables for capital repair work, and the possibility of their being reapproved must be determined by the appropriate union organizations in light of decree No 695.

Gosbank accepts as a portion of the credit for incomplete production expenses for structures that have been turned over to the client but not registered by documents for presentation to the bank and also for documents that have been handed over to the bank in order to settle accounts, the payment deadline for which has not arrived. Loans are made for these purposes under the conditions that the established timetables for drawing up documents and presenting them to the bank are observed and also the timetable for payment of work that has been completed. Costs for which these timetables will not be observed are not accepted by the bank towards credit. Information concerning the existence of structures that have been put into use indicating the timetables for drawing up their documentation to settle accounts must be presented to the bank two times per month, that is, at the moment they are drawn up and when credit is obtained for incompleting production.

With the aims of ensuring control over the work that is done at the structures where capital repair work is planned an interpretation of the incompleting production must be presented at the same time with the balance to the bank every quarter in the form that has been defined and every month for the structures that have not been turned over for use.

The Gosbank acts differentially to economic agencies when extending credit. An evaluation of their activity is made according to the following indices: the start up of production capacities and structures; the volume of construction commodity production; labor productivity; profits.

Construction and repair organizations are grouped with those that are operating well or poorly according to whether these indices are met or not met and also depending on the safety and correct use of their personal circulating capital, the status of the reserves of commodity and material valuables and the fulfillment of the obligations to the Gosbank for obtaining the loan. The former may have the following privileges when obtaining credit: the ability to obtain loans for temporary needs that arise during the course of completing the plan for a period of up to 30 days; a reduction by half of the percentage rate for credit on time loans; an increase of funds for pressing needs by 50 percent. The latter are transferred (completely or in part) to a special credit rate under which: the issuing of all types of loans is done only with a guarantee by the above-mentioned organizations within the limits of the sum of personal circulating funds that are lacking (in the case of where there is no guarantee condition Gosbank institutions discontinue further credit to the contractor organizations and recover the loans that have been issued ahead of schedule); a discontinuation of issuing loans for those types of credit for which there is overdue indebtedness.



The transition to a new system of credit will lead to regulating financing and planning discipline for construction and repair organizations, reduce the time for production capacities and structures to be put into operation and improve the effectiveness of capital investments.

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## CONSTRUCTION PLANNING AND ECONOMICS

### FAILURE TO USE NEW CONSTRUCTION INDICATOR PROPERLY CRITICIZED

Moscow KHOZYAYSTVO I PRAVO in Russian No 3, Mar 82 (signed to press 2 Mar 82) pp 15-18

[Article by V. Dulich, chief, Capital Construction Statistics Control Department, USSR Central Statistical Administration: "The First Year of Work Under the New Plan"]

[Text] As is known, since 1981 the planning, calculation of completed work and evaluation of the operational activity of construction and installation organizations have been performed according to a new indicator: commodity construction output.

The new operating conditions, which were set up in connection with a resolution adopted by the CPSU Central Committee and the USSR Council of Ministers on 12 July 1979, give builders more reason than before to be interested in concentrating labor, material and technical resources on projects already under construction and, in the final account, in reducing construction time and the number of projects under construction at the same time. The new way of operating has already produced some tangible results: the turbine at Ekibastuzskaya GRES-1 went into operation ahead of schedule, along with the motor vehicle tire production facility at the "Chimkentshina" production association, the coal extraction installation at the "Tomskaya" mine in Kemerovo Oblast, and the metal-cutting machine tool production equipment at the "Krasnyy Metallist" forging and pressing equipment plant in Astrakhan'.

At the same time, an analysis indicates (and this was discussed at the recent November Plenum of the CPSU Central Committee) that the changes in the construction process are still being made rather slowly. The annual plan for commodity production for 1981 was distributed extremely unevenly among the four quarters. For instance, in the first quarter the construction organizations throughout the country as a whole produced only 5 percent of their annual volume, with the figures for the second, third and fourth quarters being 19, 23 and 53 percent, respectively. The delivery of projects proceeded even more unevenly. As before, USSR Gosplan and the ministries and departments are planning to introduce most of them during the second half of the year. The fourth quarter is again turning out to be the most important one. This leads to shock work and a reduction in the quality of the commodity production.

The situation is also complicated by the fact that a significant part of the projects that were not released for use in 1980 were included in the plan for

introduction during the second half of 1981. For example, at USSR Minstroy [Ministry of Construction] such projects constituted 65 percent of the total number passed on from 1980, and at USSR Minpromstroy [Ministry of Industrial Construction] the figure was even higher, at 68 percent. The reasons given were old ones: a low degree of preparedness for construction and a shortage of the needed technological and power equipment, materials and designs. The planned unevenness in the introduction of projects resulted in a situation where the plan for the first half of the year was clearly understated for many organizations. This enabled individual ministries and central boards to exceed it quite easily.

The shortcomings in capital construction--one is forced to reach this conclusion after analyzing the situation that exists--can be explained largely by violations of planning and financial discipline on the part of ministries, departments and construction organizations. Actually, however, the introduction of the new indicator--commodity construction output--was preceded by a strengthening of this discipline, through the creation of new and improvement of existing normative documents and regulatory construction orders at almost all stages of the work. For instance, USSR Gosplan's Resolution No 86, dated 24 April 1980, confirmed the "Temporary Methodological Directives for the Planning of Commodity Construction Output." In Letter No 107-D/233/318, dated 14 November 1980, USSR Gosstroy, USSR Stroybank [All-Union Bank for the Financing of Capital Investments] and USSR Gosbank established an order for calculations between customer and contractor of the estimated value of commodity construction output for enterprises that are completely finished and ready to go into operation, sections, complexes under construction and projects ready for production operations or the rendering of services. The USSR TsSU's [Central Statistical Administration] Regulation No 190/6, dated 22 December 1980, concerning the order of compilation of statistical reports on capital construction, established the order of accounting for commodity construction output and reflecting it in statistical reports. It specified, in particular, that the bases for inclusion in the actually completed volume of commodity construction output are:

- acts, signed by a State Reception Committee, for the reception for operational use of enterprises, sections, complexes under construction and projects ready for production output or the rendering of services;
- acts of State Reception Committees for the reception of projects of a residential and civil nature;
- acts of working committees for individual buildings and structures ready for production output or the rendering of services that are part of complexes under construction, enterprises or sections of enterprises, if operational use is specified before total completion of the construction of projects under construction;
- acts for the reception of completed work for complexes of special construction and installation work released to general contractors after completion by subcontractors at enterprises, complexes under construction, sections and projects that are under construction, capital repair work and work done to organize public services and amenities and the planting of greenery in adjacent areas done after projects are released for operational use in accordance with USSR Gosstroy's Resolution No 38, dated 13 March 1975.

Special mention should be made of the fact that production capacities and projects are assumed to be in operation from the moment a State Committee signs an act, regardless of when it is confirmed by the agency that appointed the committee. Besides this, it has been decided to accept production capacities and projects for operational use only if all unfinished work has been completed and production output

has begun on the installed equipment or services have begun to be rendered, as specified by the plan.

The procedure for handing over finished output further specifies that one month is allowed for the official registration of signed acts and the making of decisions on the basis of the results of discussions of objections raised by individual members of State Reception Committees. However, if the acts are not approved by the agency that appointed the State Reception Committee, that volume of commodity construction output is eliminated from the report. In connection with this, state statistical agencies, USSR Stroybank and other monitoring organizations must make a careful study of the reasons for which an act is not approved. If it is because the project is not ready for operational use or there is a large amount of unfinished work, these facts should be examined separately and the guilty parties held responsible in accordance with the ukase of the USSR Supreme Council's Presidium dated 24 May 1961, where it is stated, in particular, that additions in a state report and the presentation of deliberately distorted reported data on the fulfillment of plans must be considered to be antistate activity causing harm to the national economy, and that the people responsible for it are to be punished by deprivation of freedom for a period of up to 3 years.

There is yet another question that, in our opinion, requires an explanation. Up until now not all leaders knew how to reflect in a report commodity construction output taken on by subcontracting organizations. The "Temporary Methodological Directives for the Planning of Commodity Construction Output" specify that it is included in a report when complexes are handed over or special work is completed, immediately after its completion, regardless of the date enterprises or projects are turned over for operational use by the general contractor. This stimulates subcontracting organizations to finish their work on complexes more rapidly and enables them to realize commodity construction output sooner and calculate the credit obtained with the bank. This order also simplifies the subcontracting organizations' accounting for commodity construction output. Nevertheless, there frequently occur cases where general contractors delay, in every way possible, the formal registration of work done by subcontractors until the entire project is handed over for operational use.

The practical operation of construction organizations under the new management conditions has shown that, from time to time, commodity construction output is not presented for payment for a long time after it is turned over to the customer, although USSR Gosbank's instructions for the extension of credit to contracting organizations state quite explicitly that accounts should be turned in for payment within 5 days. These delays occur because projects are turned over for operational use with flaws and--quite naturally--the agencies of USSR Stroybank that are performing the monitoring function do not pay an account until all unfinished work is completed.

The considerable gap in time between the handing over of commodity output and the presentation of it for payment results in distortion of the evaluation of the financial results of the activities of construction and installation organizations. This temporal gap diverts significant contracting organization resources to expenditures for incomplete construction production work and causes their financial position to deteriorate. In order to shorten this gap, the established order for the reception of projects should be observed strictly.

It should be mentioned here that in construction organization reports, as before, there remain the indicators of the total (gross) volume of contracting work. This



necessary for calculative purposes: determining the need for material and technical resources, the wage fund, working capital and credits and so on. We consider it necessary to monitor the performance of the total volume of work for an organization as a whole and for individual projects, in order to insure that there is a normal inventory of construction work in progress.

The experience gained in working during the first year of the new five-year plan showed that some organizations overstated their estimates of the fulfillment of the plan for commodity construction output and included in their reports volumes of construction work on projects that were completed and handed over in the preceding reporting year. For instance, USSR Minenergo's [Ministry of Power and Electrification] "Tadzhikgidroenergostroy" trust illegally included in its report the sum of 5.5 million rubles for the porcelain plant under construction for USSR Minlegprom [Ministry of Light Industry], for which the act was signed by the State Reception Committee on 30 December 1980. Naturally, we eliminated this amount of work from the report. Similar events have occurred in organizations subordinate to USSR Minpromstroy, USSR Ministroy and USSR Minsel'stroy [Ministry of Rural Construction]. There have also been quite a few cases where the indicators for the release of projects for operational use were not correlated in the plans with the commodity construction output indicators. For instance, the Azerbaijan SSR Minsel'stroy's PMK-10 plan for commodity output for the second quarter of 1981 amounted to 415,000 rubles, whereas the estimated value of the construction and installation work on projects handed over for operational use during this quarter was 3 million rubles. As it turned out, the assignment for commodity output in the amount of almost 2.6 million rubles was transferred to the second half of the year. It was planned that the "Aktyubsel'stroy" trust of the Kazakh SSR's Minsel'stroy was to turn over a poultry meat plant for operational use during the second quarter, but the commodity construction output, in the amount of 3.3 million rubles, was carried over to the third quarter. Quite understandably, this practice leads to confusion and causes problems. This is not the only bad effect it has, however: it also affects the collectives' material stimulation funds.

Spot checks conducted by state statistics agencies in construction organizations in 1981 showed that in many trusts the plan for the total volume of commodity construction output was determined not on the total amount of the estimated value of the construction and installation work, but after deducting work on projects under construction that was turned over to the customer before the beginning of the year. There were also instances where different annual commodity construction output plans for individual construction projects were approved for the customer and the contractor. For instance, the year's commodity output plan for the construction of an agricultural machinery plant in Gomel' was set at 15.2 million rubles for the Belorussian SSR Minpromstroy's "Gomel'promstroy" association, whereas for the customer (Minsel'khoz mash's [Ministry of Agricultural Machine Building] "Gomel'mash" production association) it was set at 20.75 million rubles. According to the commodity construction output plan for the construction of capacities for the production of braided kapron thread, as given to the "Grodnopromstroy" association, the amount allocated for the year was 0.6 million rubles, whereas the Grodno synthetic fiber plant was led to believe it was 2.8 million rubles. Commodity construction output amounting to 1 million rubles was approved for the Ukrainian SSR Minpromstroy's "Sudopromstroy" trust for the modernization of the ZhBI-1 plant, but the figure given the plant itself was 1.5 million rubles. It is understandable that such lack of coordination in the plans results in disbalance in the deliveries of

material resources and equipment and, in the final account, to an artificial delay in the release of projects needed by the national economy.

As is indicated by the practical work performed by construction organizations last year, for the successful introduction of the evaluation of their activities according to the commodity construction output indicator, it is necessary that the ministries and departments do a lot more work to improve the planning of this indicator and to implement all the measures outlined by the resolution "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Improving Production Efficiency and Work Quality," which was adopted by the CPSU Central Committee and the USSR Council of Ministers on 12 July 1979. Above all, this means further work to complete the conversion of construction projects to the integrated supply of materials on the basis of orders from construction and installation organizations in accordance with their needs, as determined by plans and estimates, the timely issuing of technological and power equipment throughout the entire working period, and the transformation of the construction process to a rhythmic technological flow.

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## CONSTRUCTION PLANNING AND ECONOMICS

### INTENSIVE FIXED CAPITAL GROWTH AFFECTS PRODUCTIVITY

Moscow *PLANOVOYE KHOZYAYSTVO* in Russian No 9, Sep 82 pp 25-37

[Article by D. Palterovich, doctor of economic sciences, and V. Filimonov, candidate of economic sciences: "The Intensive Path of Development of Construction Fixed Capital"]

[Text] Economy of the means of labor at the present stage of development of construction is of particularly important significance; it is characterized by the existence of a considerable park of equipment, reduction of the number of workers, exacerbation of the problem of comprehensive mechanization of production. Under conditions of a sharp increase in the machine-worker ratio, it is difficult to overestimate the growing role of control of the quantitative and qualitative composition as well as use of the machine park of construction organizations.

Large funds are allocated for the technical equipping of construction. Just in the past three five-year plans, its fixed production capital increased 4.6-fold and toward the end of 1980 amounted to 55 billion rubles. The park of basic construction machines (excavators, bulldozers, scrapers and mobile cranes) grew from 241,000 units in 1965 to 577,000 units in 1980, that is, 2.4-fold; moreover, there are to be found in construction hundreds of thousands of other large machines and tools. The capital-labor ratio grew more than threefold. The costs of operation of machines and mechanisms in 1980 comprised 13.4 percent of the cost of construction-installation work versus 8.3 percent in 1965 and 2.5 percent in 1940. All this has contributed to a growth of labor productivity in construction of 1.7-fold during the three five-year plans and to a reduction of the share of manual labor from 60.1 percent in 1965 to 49 percent in 1979.<sup>1</sup>

Such a rapid growth of the production apparatus of construction would have been impossible without a sharp increase in the production of construction and road machine building whose volume has grown during the three five-year plans 3.3-fold and exceeds that of Western European countries taken together. The USSR now produces a greater number of units than the United States of such machines as excavators, bulldozers and scrapers, although unit capacity and other parameters of the equipment do not always meet present requirements.

In the development and use of construction fixed capital, extensive tendencies still predominate. This is shown by the fact that fixed-capital growth significantly exceeds the growth of construction production. From 1965 to 1980, the cost of performed construction-installation work per ruble of fixed production capital decreased 2.35-fold; moreover, during the 8th Five-Year Plan, this indicator characterizing output capital dropped 23.3 percent, during the 9th—16.7 percent and during the 10th—33.3 percent.

Such a situation is to be explained by a number of reasons, including slowing down of the growth rate of capital construction, dissipation of capital investment as well as of manpower and material resources because of an excessively large number of construction projects, defects in the field of material-technical supply and organization of construction production. But the most direct influence on the use of fixed capital in construction is being exerted, we believe, by defects in the functional, technological, type-size, reproductive structures of the means of labor as well as in the system of operation of the machine park.

First, the component structure of fixed capital does not always have a rational correlation of the active and passive parts, and within each of them, the relative share of the different means and tools of labor considerably deviates from the norm. Second, the disparity of the technological and type-size structures of the machine park to the structure of completed work reduces effectiveness and creates significant excess outlays connected with the formation of the park and operation of the machines and mechanisms. Third, the process of reproduction of the park is frequently aimed at its quantitative expansion with inadequate technical renewal. Fourth, the system of machines worked out for construction has still not become the basis for creation and production of equipment as well as for formation of the machine park providing for comprehensive mechanization of construction work. Fifth, departmental disconnectedness of control of the use and repair of equipment in addition to other factors results in deterioration of the use of machines in time and in capacity and in growth of costs and deterioration of repair quality.

A consequence of these circumstances has been reduction of yield on capital. For the purpose of transition to an intensive path of development of the machine park, there would have to be solved a complex of organizational technical and economic questions connected with the development and realization of a system of measures for improving the structure of fixed capital in construction. The first priority task should be, in our opinion, the preparing of appropriate normative-methodological support of planned and purposeful control of the process of transition to intensive reproduction of fixed capital.

The factors enumerated above have had a particular effect during the 10th Five-Year Plan where growth of the volume of construction-installation work amounted only to 4.7 percent; moreover, in a number of construction ministries its volume perceptibly decreased while the park of basic machines increased: excavators by 16.9 percent, bulldozers by 14 percent and mobile cranes by 24.8 percent. But whereas for 1 percent of work growth, the equipment park increases 3-5 percent, reduction of output for one machine cannot be avoided. In addition, since the growth of the number of workers has lagged significantly



behind the growth of fixed capital and park of machines, this has still further reduced the possibility of maximum load of equipment.

As an example of the noted phenomena, let us examine the indicators of the USSR Ministry of Heavy and Transport Machine Building. During the 9th Five-Year Plan, the volume of work performed by the organizations of the ministry grew an average of 3.1 percent a year, but during the 10th Five-Year Plan it dropped by 0.8 percent a year. Average annual growth of labor productivity dropped from 4.7 to 0.5 percent, whereas fixed production capital and yield on capital continued to increase at practically the previous rates. While during the 9th Five-Year Plan a 1-percent growth of labor productivity required a 1.7-percent rise of its capital-labor ratio, in the 10th Five-Year Plan the figure was 15.2 percent. At the same time, the drop in yield on capital sharply increased: during the 9th Five-Year Plan, its average annual rate was 3.1 percent, during the 10th Five-Year Plan the figure was 6.6 percent. It can be seen from this that indicators of fixed-capital use depend in large measure on the total results of production: its growth rate and rise in labor productivity.

An important role is also played by the dynamics of the machine park and the degree of its oversaturation compared to the need determined on the basis of norms of park size per unit of work. For example, the capacity of the excavator park in cubic meters of the summated bucket capacity during the 10th Five-Year Plan grew twice as fast at the USSR Ministry of Heavy and Transport Machine Building as the volume of excavation work. As a result, despite growth of the technical level of the machines, average output per cubic meter of bucket of excavators dropped 4.2 percent, while the actual size of their park exceeded by 30 percent the requirement norm.<sup>2</sup> Productivity at materials handling operations decreased almost 18 percent, while their volume dropped 2 percent yearly with a 4.3-percent growth of the capacity of the crane park per year and with a considerable excess of them compared to norms. Thus for jib cranes, the excess was more than 50 percent. The bulldozer park, on the other hand, increased a little slower than the volume of bulldozer work. As a result, the size of this equipment was close to the norm and the output of a conventional bulldozer increased 13 percent in the course of the five-year plan.

The reduced indicators of use of the basic machines is in large measure to be explained by the disconnection of the production capacity of the machine park from the dynamics of work volume, which has been responsible for the formation of park capacities that are excessive in regard to the actually completed volume of work.

The excess number of the machines also helped complicate problems relating to organization and management of their use, servicing and repair. And this is understandable since the possibilities of effective management of the functioning of any production system are limited by the size of the system. On the attainment of a certain quantitative level within the framework of unchanging technical resources, forms and methods of organization and operation, the system becomes uncontrollable. Such a limit of the quantitative should be called the "threshold of controllability." According to the research carried out by

the Warsaw Institute of Mechanization of Construction on the dependence of the controllability of a machine park on its quantitative growth, it was established that the threshold of controllability of such a system is determined by the availability of not more than 95-100 machines per 1,000 workers; in the absence of a developed flexible system of operation of a park with the use of modern means of communication, transmission and on-line processing of information, the threshold of controllability is reduced to 80-90 units. Incidentally, at the USSR Ministry of Heavy and Transport Machine Building in 1975 and in 1980, there were respectively 94.4 and 111.7 basic machines per 1,000 workers, which exceeds the threshold of controllability and results in deterioration in the use of the park.

Oversaturation of the park complicated the organization and coordination in the interaction of the machines with other productive resources. This is indicated by the structure of losses of machine time, 80 percent of which were due to the absence of a work front, materials, workers at projects and planning estimate as well as downtime in repair.

The effectiveness of construction fixed capital depends to a decisive degree on their structure. There are to be included among the most important structural proportions correlations between the active and passive parts of the capital and within the active part--between the basic and incidental construction machines, the technology of solvent-concrete operations, equipping services, means of transport, shift equipment workers, production equipment, means of small mechanization and mechanized tools. The indicated proportions have not been sufficiently studied, the normative base of their optimization is quite imperfect or is lacking, and in practice they are frequently formed spontaneously and turn out to be economically inefficient. Let us consider some of these proportions.

In fixed-capital structure, the active-part portion comprises more than 60 percent. In the '70s, it was reduced somewhat due to an increase in the share of buildings and structures. At the same time, the relative share of measuring and regulating instruments, laboratory equipment and especially of computer equipment grew, while tools and equipment were fewer (Table 1). Thus changes in the structure of fixed capital have increased the contradictory character; moreover, analysis attests to the inadequate development of certain elements of both the active and the passive part of it.

In the fixed-capital structure of construction ministries and organizations, differences are significant and not always justifiable. Why, for example, for each ruble of active capital in the USSR Ministry of Industrial Construction does the passive part amount to 0.39 rubles while at the USSR Ministry of Construction it is almost 1.6-fold greater? Their regional structure of work is approximately the same and so is the output-capital ratio of industrial facilities under construction (nonferrous metallurgy, chemistry, metalworking). In our view, the reason is to be found in the absence of unified methodological approaches to the solution of problems of formation and planning of the development and renewal of fixed capital. For this reason, each construction agency forms without a profound economic validation the composition and structure of capital. No scientific recommendations exist for the problem of optimal development of the fixed-capital structure.

Table 1. Structure of Fixed Production Capital Used in Construction  
(in % of total at beginning of year)

Fixed-capital items	1971	1979
Buildings	21.0	24.2
Structures	8.5	11.1
Transmission equipment	1.8	1.9
Machines and equipment, including	48.1	43.8
power	4.7	4.0
workers	42.3	37.8
measuring, regulating instruments and devices, laboratory equipment	0.5	0.7
computer equipment	0.2	1.1
Means of transport	17.3	16.9
Tools, production and maintenance equipment, various forms of fixed capital	3.3	2.1

Let us consider in more detail extent of equipment of the fixed-capital items of organizations of the USSR Ministry of Heavy and Transport Machine Building. As can be seen from Table 2, the actual extent of equipment for all capital is on the average close to normative,<sup>3</sup> for the passive part—16.4 percent higher and for the active part—5.4 percent below it. Thus the correlation of the active and passive parts did not correspond to that computed according to norms.

Within the framework of investigation of problems of effectiveness of the process of reproduction of fixed capital of construction use at the Scientific-Research Institute of Organization of Management in Construction attached to the Moscow Engineering Construction Institute imeni V.V. Kuybyshev, an attempt was first made to establish optimal correlations between its passive and active parts.

In particular, there were validated and constructed two regression models of the dependence of the indicator of total yield on capital ( $\Phi$ ) on the relative share of the passive part (P). A most elementary relation is depicted by the parabolic function

$$\Phi = 0.522P - 0.009P^2 + 4.069.$$

A second, more complex model, proposed by S.A. Smolyak, takes into consideration partial elasticity ( $\alpha$ ) of the active and passive parts of the fixed capital:

$$\Phi = 4.315P^\alpha(1-P)^{1-\alpha}.$$

The calculation performed with the help of these models on the data of selective surveys encompassing 80 percent of the subdivisions of the USSR Ministry of Heavy and Transport Machine Building made it possible to establish the area of optimal values of the relative share of passive capital according to the criterion of maximum yield on capital. The sought optimum was determined within the limits of 27.3-29.0 percent, which corresponds well with the analogous normative indicator equal to 28.8 percent (see Table 2). The computed yield on capital,



Table 2. Equipment of Organizations of USSR Ministry of Heavy and Transport Machine Building with Chief Items of Fixed Capital (in thousands of rubles per million rubles of work on average for 1976-1980)

	Capital equipment				Actual in % of normative
	Actual		Normative		
	thou- sands of rubles	% of total	thou- sands of rubles	% of total	
Fixed capital—total	374.8	100.0	371.7	100.0	100.8
including:					
passive part	124.5	33.2	107.0	28.8	116.4
active part	250.3	66.8	264.7	71.2	94.6
including:					
leading workers, machines and equipment	198.2	52.9	156.3	42.1	126.8
small-scale mechanization equip- ment and mechanized tools	3.1	0.8	6.4	1.7	48.4
other machines and equipment	49.0	13.1	102.0	27.4	48.0

corresponding to the indicated optimum, was 30-35 percent higher than the average actual level for the analyzed period, which attests to significant reserves for boosting the effectiveness of fixed capital through optimization of the proportion between their active and passive parts.

A more detailed analysis of the composition of individual capital groups (according to the results of selective surveys of different construction organizations) provides the basis for thinking that the surplus of passive capital applies to administrative and operational buildings and to items of social and consumer designation. At the same time, an acute shortage is observed of facilities of production designation: repair and operational bases for the park of construction machines and technological motor transport, inventory facilities of warehousing and servicing character (construction-superintendent and dispatcher facilities, distributing tool shops and the like). Thus, to organizations of the USSR Ministry of Heavy and Transport Machine Building, availability of facilities belonging to the repair and operational base comprises about two-thirds of normative requirements. Such disproportions are frequently observed as well at other construction ministries.

For raising effectiveness of use of the park of fundamental equipment, it is necessary to achieve the combined development of the capacities of the repair and operational base. It seemingly is advisable to examine the question of redistribution of capital investment for the erection and expansion of plants for production and repair of construction machinery by increasing the share of funds for the production of progressive equipment and for raising the quality of machines and developing specialized repair enterprises.



Growth of the above-mentioned disconnectedness capacity of the machine park and structure of construction work promotes a change in the reproductive structure of capital investment connected with the policy of increasing the share of modernization and reequipping of existing production. Inasmuch as in the course of many years capital investment has been essentially aimed at the erection of new facilities, the park and consequently the production of construction machinery have a predominance of equipment intended primarily for new construction. Under conditions of a significant growth of the share of work relating to modernization and reequipping there is a growth of disproportions between the structure of this equipment and the character of completed work.

The specific conditions of production of work during modernization include crowdedness of areas, limitation of the size of intrashop spaces for the movement and coordinated use of construction equipment and the necessity in a number of cases of organizing work "to one side" (in modernization without stopping of basic production). All this restricts the possibilities of using machines of traditional operation and results in large losses of machine time and makes unnecessary a significant portion of large-size powerful equipment. It is clear that in the absence of special measures for regulating the structure of construction machinery the rate of decrease of yield on capital will inevitably grow in proportion to the increase in the share of modernization work.

To increase yield on capital in modernization, it is necessary to provide for the manufacture of special-performance machines (small-size bulldozers, excavators and loaders as well as specialized electrified and pneumatic tools). Moreover, all the resources of mechanization should be designed and made in accordance with the essentially new technology of performing such work. The cost of such equipment under conditions of its specialized production will be considerably lower than of traditional machines because of lower materials intensiveness, power of engines, repair costs and so on; this will make it possible to "lighten" the balance of the fixed capital of construction organizations.

In the planning of machine needs, it is important to take into consideration the structure of the program of construction work on the basis of guidelines, correcting requisitions for equipment of traditional nomenclature. Moreover, a significant reserve of "clearing" of the fixed-capital balance exists in the transfer of not needed equipment to other organizations or subdivisions. With the provision of construction with special machines and replacement of equipment of traditional performance, the reduced yield on capital under the influence of growth of the share of modernization should be nullified.

Reduced yield on capital also has taken place because of growth of prices for basic machinery per unit of their capacity (productivity). It is due to an increase in the park of the share of more expensive equipment of traditional nomenclature (with hydraulic drive, special climatic performance, including imported equipment with improved ergonomic characteristics). For example, the single-bucket EO-4121 hydraulic excavator (capacity of 0.65 m<sup>3</sup>), replacing the E-652B model with a cable drive, has a certified productivity that is 7 percent greater than the latter, which costs twice as much. The effect of this factor amounts to no less than 2.3 percent of the 6.8 percent of the average annual reduction of yield on capital.

In some ministries the effect of this factor is even greater. At the USSR Ministry of Heavy and Transport Machine Building, for example, the increased cost of a unit of capacity of construction machines has been responsible for a virtual growth of 2 to 3.5 percent a year for the machine-worker ratio. The change in the structure of construction work and equipment cost can explain up to 40 percent of the total drop in yield on capital. Another approximately 30 percent of this drop can be explained by the need to make up the losses of production capacity of construction organizations connected with curtailment of the number of personnel at the ministry of about 1.3 percent a year. The remaining portion (roughly 30 percent) of the reduction in yield on capital is due to such factors of reproduction of fixed capital as the level of capital equipment of construction organizations, the structure of the machine park, the degree of its wear and the state of the repair and operational base.

The prospects of increasing productivity and working time of machines and therefore of reducing the size of their park is estimated as quite high by specialists. In particular, the possibility is noted of raising annual productivity 1.6-1.7-fold by raising the shift coefficient of operation of construction machines to its optimal level and 1.3-fold compared to the achieved level by reducing the time spent on technical servicing.<sup>4</sup>

This, of course, does not mean the possibility of completing the present-day level of construction work with the help of one-half of the existing machine park; this first requires a change in its structure and the creation of the necessary organizational and economic conditions. But it is clear that the reserves of reducing the size of the park are great and that in itself a reduction of output and deliveries of traditional machines will serve as a factor inducing construction workers to better utilize available equipment.

In examining the makeup of the active part of the fixed capital at the USSR Ministry of Heavy and Transportation Machine Building (Table 2), we have already noted the excess of excavators, cranes and other machines.<sup>5</sup> At the same time, there is a shortage of resources of small-scale mechanization and mechanized tools.

We know how effective is the use of mechanized tools in finishing and other work. According to the data of the Central Scientific-Research and Experimental Planning Institute of Organization, Mechanization and Technical Assistance to Construction of Gosstroy USSR, 10 such tools costing less than 1,000 rubles would make it possible to release one worker, while in excavation and installation work it is necessary to spend from 5,000 to 15,000 rubles. Outlays on mechanized tools are paid back in several months, but they are not produced in adequate quantities. According to the Statute on Organization of the Tool Industry in Construction approved by Gosstroy USSR in 1980, the equipment norm of means of small mechanization amount to 10,600 rubles per million rubles of estimated cost of work, which exceeds 2.5-fold the comparable indicator for 1971. But according to specialists of the Scientific-Research Institute of Construction Economics of Gosstroy USSR, this norm has been set too low and actually should amount to 15,600 rubles. The need for means of small-scale mechanization and mechanized tools is being satisfied approximately

40 percent and even less in many organizations. Hence it is necessary to change the situation relative to supplying construction with them; possibly to specialize for their production enterprises of the Ministry of Construction, Road and Municipal Machine Building making equipment of which more than needed is produced.

Availability is sharply behind requirements of equipment for technical servicing and repair of construction machinery, computer equipment and other control equipment as well as measuring and regulating instruments and laboratory equipment. Half of the measuring equipment and instruments are general technical. Although they are series produced by enterprises of the Ministry of Instrument Making, Automation Equipment and Control Systems and other ministries, the need for them is satisfied 30-40 percent. The other half of specifically construction instruments is produced by semihandicraft [polukustarnyye] methods at enterprises of different agencies. These instruments as a rule are not standardized and more than a quarter of them do not provide reliable readings. It is obvious that instrument making has to fully satisfy the requirements of construction for instruments, including special instruments.

A special shortage is being experienced in mobile stock of technical servicing equipment and repair of construction machinery under field conditions: mobile repair shops, refuelers, special machines for technical servicing and others. For example, at Kaliningradstroy Production Association of the USSR Ministry of Construction, availability of the said equipment in 1980 was: 28 percent for oil and fuel mobile units, 33 percent for technical maintenance units, 80 percent for automotive repair shops for technical servicing and repairs. Their shortage has a negative effect on use indicators of basic machines. Thus the coefficient of use of machines (relation of time of operation to total calendar time of presence at an operation) on the average is equal to 0.56 for the park. Calculations show that in nonfulfillment in scheduled time of more than 20 percent of planned quantity of technical servicing, overexpenditure of funds for planned repairs of construction machines amounts to more than 3 percent of all expenditures for the operation of machines of subdivisions of construction mechanization.

In our opinion, it is necessary to implement measures at construction ministries, departments and associations for regulation of the composition and optimization of the structure of fixed capital while taking into account the special features of each subdivision, the conditions of capital, the state of the production infrastructure in the region and other factors. But it is clear that before optimizing the structure of capital, it will be necessary to develop a method of its valuation and to determine to what extent the structure of the machine park deviates from optimal. In this connection, a method is proposed of quantitative valuation of the structural characteristics of the park. Let us illustrate its basic positions on the example of its type structure.

The type structure of the park of driving machines is characterized by the correlation of the relative shares of each type of equipment. The machine park of one type is quantitatively determined by the indicator of technical capacity, expressed in conventional standard machines of the given type--conventional excavators, bulldozers, cranes and the like. Conversion to conventional units



of measurement of the capacity of the park is done with the help of comparative coefficients of productivity of machines of different type sizes and brands compared to the standard model.

The method of conventional natural measurers of technical capacity of machines of different kinds makes it possible to express the total capacity of the park in standard comparable units, that is, in a number of conventional standard machines. This method also has the advantage of providing the possibility of quantitatively expressing qualitative changes for different models of machines manifested in a change of their productivity as a consequence of modernization and improvement. Moreover, it is possible in this connection to take into account reduction of productivity of machines because of aging and physical wear.

Thus the total number of effective units (that is, with account being taken of quality) of the overall park can be expressed by the sum of conventional machines:

$$N_{total} = \sum_{i=1}^n N_i$$

where  $N_i$  stands for the number of conventional standard machines of the  $i$ -type, each,  
 $n$  stands for the number of types of equipment in the overall park of a construction organization.

The type structure of the park may be described by an equation of indicators,

$\alpha_i = \frac{N_i}{N_{total}}$  calculated for all  $n$  types of machines. It is clear that

$$\sum_{i=1}^n \alpha_i = 1.$$

For an evaluation of the type structure of the park, the actual equation of the different kinds of machines must be compared with an optimal one which can be calculated on the basis of corresponding normatives, particularly on the basis of norms of requirements for construction machines. The relation of the actual structural proportion ( $\alpha_i^a$ ) to the normative ( $\alpha_i^n$ ) in the optimal case is equal to one. At the same time the difference

$$1 - \frac{\alpha_i^a}{\alpha_i^n}$$

will characterize the deviation of the actual structural proportion for  $i$ -type machines from the optimal, while the total of the absolute values of these deviations (taken with a plus sign) for all the types of equipment will be the characteristic of discrepancy between the actual and optimal structures. Let us call this total the indicator of optimality of the type structure.<sup>6</sup>

Calculations show that the actual relations  $\alpha_i^a$  are stable for 3-5 years and significantly do not differ in the organizations of a ministry; they have characteristic features in different construction ministries. It would appear that in the formation and renewal of the park of ministries, departments and



organizations it would be useful to determine and take into consideration the special features of the type structure of the leading means of mechanization.

Table 3 presents the results of calculations performed according to the described scheme for the subdivisions of a number of ministries with reference to the four most important types of machines. It can be seen from the table that the best type structure is at Glavsevkavstroy and the worst at Glavsreduralstroy. In comparing the indicators of real output of machines for the subdivisions (the level of this indicator at Glavsevkavstroy has been taken to be 100 percent), it is possible to make the conclusion that as a rule the best structure has a higher productivity of equipment.

Of special importance to raising the efficiency of construction production is improvement of the type-size structure of the equipment park and bringing it into accord with the character of performed work. In the structure of excavators, bulldozers, scrapers, trench diggers, single-bucket loaders, machines of small and medium capacity predominate. There is an almost total absence of machines of very small capacity that are needed for the mechanization of small-scale and scattered work and also of machines of large unit capacity providing a significant rise in the efficiency of large-scale digging work and cultivation of stony or frozen ground.

Comparison of the existing and optimal type-size structure of the park of basic equipment for digging work as done by N.G. Dombrovskiy<sup>7</sup> shows that in particular it would be advantageous to have among one-bucket excavators 10 percent of the machines with a bucket capacity of up to 0.15 m<sup>3</sup> and 0.8 percent with a capacity of 8-25 m<sup>3</sup>. Fourteen percent of the bulldozers and tractors should be of 8-35 horsepower, 29 percent with 260-630 horsepower and, in addition, 6 percent with a power of 631-2,500 HP. But there are practically none of these machines. At the same time, the share of machines in the park of excavators with a bucket capacity of 0.15-0.65 m<sup>3</sup> totaled 96 percent instead of the required 35 percent, of bulldozers of 40-75 horsepower--85 percent instead of 8 percent and of bulldozers of more than 130 horsepower there were only 2 percent in the park instead of the 69 percent in the optimal structure. Ninety-nine percent of the scrapers had a bucket capacity of up to 10 m<sup>3</sup>, whereas the optimal structure called for 45 percent of the scrapers possessing a bucket capacity of 11-15 m<sup>3</sup> and 32 percent--16-50 m<sup>3</sup>. At the same time, 80 percent of the scrapers were attached whereas it would have been advantageous for 71 percent of the scrapers to be self-propelled.

As a result, equipment of small and medium capacity is primarily used in digging work, which slows down their performance and hinders growth of labor productivity. Under difficult conditions, for example, in the zone of permafrost or hard rock, digging work cannot be performed at all without the use of large-capacity machines. They therefore have to be imported.

At the same time the shortage or absence of a number of small-capacity machines (minibulldozers, scrapers-planers, trench diggers and others) is responsible for the high relative share of manual labor at small-scale scattered operations. Whereas in terms of total volume, digging work has been mechanized 99.5 percent, the remaining 0.5 percent employ no less than 15 percent of the workers

Table 3. Indicators of Type Structure and Output of Basic Equipment Park of a Number of Subdivisions of Construction Ministries for 1980

	Glavsevkavstroy	Glavkrasnoyarskstroy	Glavbryansk-promstroy	Glavskreduralstroy
Relation of actual structural proportion to normative for:				
excavators	0.998	0.960	0.777	0.876
bulldozers	0.898	0.889	0.928	0.857
tower cranes	1.056	1.096	1.173	1.036
jib cranes	1.057	1.085	1.134	1.342
Indicator of optimal type structure	0.217	0.332	0.574	0.645
Level of real output in % of Glavsevkavstroy:				
excavators	100.0	97.3	79.1	79.3
bulldozers	100.0	88.3	81.8	51.9
cranes--total	100.0	63.8	63.7	81.0
Arithmetic mean for the three types of machines	100.0	83.1	74.8	70.4

performing this work--tens of thousands of diggers, auxiliary workers and others. For the same reasons actual hourly productivity, for example, of single-bucket medium-capacity excavators according to data of surveys conducted at a number of construction organizations, amounts to only 25-35 percent of technically possible productivity: the fact is that these excavators in laying ditches for pipe or other small-scale work remove on the average in an hour one-third as much earth as in the production of work which corresponds to their technical designation. It is clear that the Ministry of Construction, Road and Municipal Machine Building jointly with construction ministries will have to determine in greater detail and as quickly as possible the need for different kinds and type sizes of machines and to optimize the structure of their output.

The determination of the damage done to the national economy by shortages of the type-size structure of machines constitutes a complex task. According to rough calculations, within the total annual sum of losses connected with deficiencies in the use, renewal and repair of machines, amounting to 1.8 billion rubles for the national economy, losses due primarily to the use of small-capacity equipment, underuse of oversized capacity and lack of correspondence of the technical designation of the machines to the structure of construction and installation work add up to approximately 0.5 billion rubles. But these calculations are based on fragmentary data or empirical relations and do not take into account either the possibilities of expansion of the mechanization front through improvement of the type-size structure of equipment nor economy in capital and operational outlays because of rejection of excessive, unused capacity or other parameters of the machines.

The comparison made by us of the actual and optimal type-size structure of the park of single-bucket excavators of organizations of the USSR Ministry of Heavy and Transport Machine Building showed that despite the considerable relative share of large-scale construction work, powerful excavators with a bucket size of  $1.4 \text{ m}^3$  or more constitute only 1.9 percent of the excavator park, while their share in the optimal structure should reach 33 percent. Of the highly maneuverable miniexcavators (up to  $0.15 \text{ m}^3$ ) about 10 percent are needed; actually they are nonexistent, while the share of the relative small capacity machines ( $0.2\text{--}0.65 \text{ m}^3$ ) approaches 80 percent instead of the required 35 percent. In optimization of the type-size structure of the park, the average bucket capacity of an excavator should be increased from  $0.625$  to  $1.275 \text{ m}^3$ , that is, doubled; the number of used machines to be almost halved. The total cost of the excavator park computed in terms of existing prices for these machines will increase in this connection a total of 10 percent, while the production cost of a unit of digging work will decrease almost 30 percent and cited expenditure—24 percent. The number of persons employed and the amount of digging work done manually will be sharply reduced.

It goes without saying that the chief role in improvement of the equipment-park structure belongs to machine building. The organization of production of construction machines of large unit capacity is connected with major difficulties and the creation of new or the modernization of existing enterprises. But, while producing each year more than 100,000 earth-digging machines, road-construction machine building cannot release sufficient capacities for the organization of production of new type-size machines acutely needed by construction.

It would be advisable to significantly reduce the production of that traditional equipment whose park of construction machines is saturated and even oversaturated and to modernize (where necessary with stoppage of production) a number of machine-building enterprises for output of acutely scarce machines and tools. As for miniequipment, the initiation of the their production is a relatively less difficult problem. It would appear, without need of qualification, that reduction of the number of produced machines will serve as a hindrance to the fulfillment of capital-construction plans. In getting fewer machines, construction will be forced to raise the use level of the existing park, which at present is roughly two-thirds lower than what is potentially possible, and also will act more carefully with regard to existing equipment.

The disproportions examined above in the structure of the fixed capital and machine park are in significant measures the consequence of the fact that the type, technological and type-size structure have not been so far subjects of systematic analysis and planning. Both the producers and users of construction equipment do not devote sufficient attention to determining the need for it. The need is usually determined in a combined fashion: its calculations are not based on an analysis of the use of the available machine park both as to time and as to technical parameters. While thousands of specialists are engaged in creation and improvement of equipment for construction and road machine building as well as in actual construction, only isolated individuals are engaged in determination of demand, and episodically at that, without the necessary feedback for machine building from the sphere of use of the equipment.



The forming and reproduction of a machine park in our opinion should be designated by a special section of the reequipment plan of each sector. This plan presupposes an analysis not only of the volume of construction and installation work but also of the correspondence of the park structure to its character and the possibilities of renewal of the park on the basis of achievements of scientific-technical progress reflected in the system of machines for comprehensive mechanization of construction production.

The system of the machines should become the basis of planning of research and development for the creation of new equipment included in complexes intended for the performance of each type of operation. On the basis of the machines' system, it is also important to plan production of new equipment in such a way as to provide for the output of the entire product mix of machines and tools appearing in the complexes. Finally, it is essential for the system of machines to serve as the basis for the forming of an equipment park in construction and control of its reproduction. With availability of a portion of the machines included in the complexes to construction organizations, the latter should be supplied only with machines and tools that are lacking.

The system of control of the use and repair of equipment also needs to be improved. The defects in management of construction repeatedly pointed out in the press connected with its departmental disconnectedness is particularly graphically manifested in the system of management of the machine park. The scattered condition results in the fact that frequently in one city a number of relatively small subdivisions engaged in mechanization and repair for plants of different construction ministries and departments perform similar functions, which reduces the maneuverability of the park, interferes with the use of advantages of concentration of production and results in economically unjustified growth of the size of the machine park. But overcoming departmental disconnectedness under the existing system of management of construction is a most complex problem. It would appear to be advisable to create on an experimental basis interdepartmental mechanization trusts at a number of large construction centers for serving all or most construction sites in a given area so that gradually a system of park management is worked out that is free of the defects of departmental fragmentation.

We think that most of all the time is ripe for solving the problem of forming a unified system of capital repair of construction equipment. At present, this repair work is being done by about 300 enterprises of all the construction ministries and departments as well as many hundreds of sectors and shops in construction organizations. Frequently, repair plants in one city repair small groups of different types of machines of their department, which does not permit utilizing the advantages of concentration, specialization and unit repair. The low series level of capital repairs results in a significant increase of their labor intensiveness and cost as well as long duration and low quality of repairs.

In our opinion, it would be useful to organize a unified system of firm repair of equipment, creating in the Ministry of Construction, Road and Municipal Machine Building for this purpose an All-Union Production Association and gradually concentrating in it the chief portion of specialized plants for the repair



of construction machinery. The concentration in one ministry of production, capital repair and modernization of construction equipment as well as manufacture of spare parts will make it possible to significantly increase the effectiveness of the entire process of reproduction of the machine park.

The tasks of optimization of the structure and reproduction of fixed capital should be solved in an integrated fashion within the framework of a unified plan for construction ministries, departments and organizations. Thus, in improving the composition of the machine park, it is necessary at the same time to improve its type-size structure, but the making up of replaceable machines in turn changes the age composition of the park and boosts its technical level and also provides for the comprehensive character of mechanization. The dynamics of the park condition requirements at the repair and operational base and the capacities of the mobile stock for performance of technical servicing and repair work, that is, they transform the technological structure (element by element) for the capital as a whole. Only such an approach would make it possible to successfully solve the problem of transition to the intensive route of fixed-capital development.

#### FOOTNOTES

1. The total share of manual labor, with account being taken of persons working manually while at machines as well as in their repair and adjustment, amounts to about 60 percent.
2. Normative requirements are computed in accordance with the Norms of Need for Construction Machines approved by Gosstroy USSR for machines of the basic product mix on the basis of the structure of the work performed by the USSR Ministry of Heavy and Transport Machine Building in 1980. Moreover the size of the park was corrected with the help of corrective coefficients that take into consideration reduction of production potential from physical wear.
3. The basis for the computation is to be found in the Model Normative Indicators of Capital Equipment of Construction Organizations worked out by the Scientific-Research Institute of Construction Economics of Gosstroy USSR.
4. See: L.I. Blank, "The Planning of Use Indicators of Machines and Number of Workers in Mechanization Administrations and Trusts." *EKONOMIKA STROITEL'STVA*, No 2, 1978, pp 55-59.
5. This conclusion is confirmed by the calculation of normative requirements for basic construction machines: the actual presence of the equipment exceeded the norm by 31.8 percent on the average for the park.
6. As the sum of relative values, the indicator of optimality of the type structure does not characterize the absolute size of the park nor its deviations from the norm; it discloses only deviations of the relative share of the different kinds of equipment in the park from the norm.

7. See: N.G. Dombrovskiy, "Effectiveness of Use of New Earth-Digging Equipment of Large Unit Capacity on the Basis of Standardized Units." MEKHAHIZATSIYA STROITEL'STVA, No 6, 1976, pp 4,5.
8. According to ball-park figures, an increase in the share of construction machines found at work of roughly from 0.7 to 0.8 percent of the total park, a rise in the shift coefficient of the operation of basic machines from 1.3 to 1.6 and of the share of use of intrashift time from 0.75 to 0.85 percent would ensure a rise in the integral use coefficient of the park on an average of 1.6-fold.

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## CONSTRUCTION PLANNING AND ECONOMICS

### IMPORTANCE OF DEPARTMENTAL NORMATIVE ACTS IN CAPITAL CONSTRUCTION CITED

Moscow KHOZYAYSTVO I PRAVO in Russian No 8, Aug 82 pp 58-62

[Article by M. Braginskiy, professor, doctor of juridical sciences, sector chief of VNIISZ [All-Union Scientific Research Institute of Soviet Legislation] of USSR Ministry of Justice: "Departmental Normative Acts in Capital Construction"]

[Text] Departmental enactments of ministries, state committees and departments, which are based not only on sectoral jurisdiction, but also on functional competence, play an important role in regulating relations in the economy. In this connection the CPSU Central Committee and USSR Council of Ministers turned attention in Decree No 558, dated 25 June 1975 and entitled "On Measures To Further Improve Economic Legislation,"<sup>1</sup> to the shortcomings that exist in the practice of publishing enactments of this kind (above all to their unjustifiably large number), and at the same time they outlined measures aimed at correcting these defects.

The complicated and highly diverse relations that come about in the field of capital construction, embracing planning, financing, the supply of materials and equipment, and procedure for performance of project planning, construction, installation and repairs, are regulated not only by laws and decrees of the USSR Government, but also by a large number of enactments of USSR Gosplan, USSR Gosstroy, USSR Gosstoy, USSR Gosbank and USSR Stroybank. In performance of their functions these bodies inevitably engage in the writing of norms.

In the time that has passed since adoption of the decree mentioned above a great effort has been made to put order in the departmental enactments in the field of capital construction. Outdated ones have been replaced by new ones, duplications, contradictions and divergences occurring in departmental normative acts have been eliminated to a considerable degree, and their number has been sharply reduced.

At the same time the problems of departmental normative acts in this field still cannot be considered altogether resolved. To be specific, the problem still remains of defining the limits of departmental prescription of norms. Both of its aspects are being referred to here: the vertical and the horizontal.

The vertical aspect of the problem is manifested in delimitation of the jurisdiction of bodies at various levels—mainly the USSR Government on the one hand and the respective ministries, state committees and departments on the other. There have been no sufficiently straightforward instructions in this regard (one of the few exceptions is Article 71 of the Bases of Civil Legislation, which provides that construction contracts for capital construction are to be concluded and performed in accordance with the rules set forth by the USSR Council of Ministers or in the procedure which it prescribes). Gaps which have been noted in legal regulation of capital construction have been filled by enactments not only of the government, but also of departments. In these cases it is now indispensable to take into account the amendment made in Article 66 of the Bases of Civil Legislation by a ukase of the Presidium of the USSR Supreme Soviet dated 30 October 1981.<sup>2</sup> This article, which previously embraced only relations in which individuals were involved, has now been extended to relations between economic entities. It specifically provides that the rules concerning the particular types of construction contracts between organizations shall be set forth only by legislation of the USSR and the union republics.

It thus becomes necessary to identify in all the enactments regulating construction contract relations between socialist organizations those codified enactments devoted to the particular types of contract work. These enactments (of the rules and regulations type [Pravila and Polozheniya]) must be approved by the Supreme Soviet or the government. As for ministries, state committees and departments, they can issue such enactments only on the basis of an order of the USSR Government.

The horizontal aspect of the problem comes down to delimitation of jurisdiction between different entities which are at one and the same level of administration. A state administrative agency may issue enactments which correspond to the tasks and functions assigned it in its regulation (statute).

But this requirement is not always honored. For example, Point 43 of Decree No 695 of the CPSU Central Committee and USSR Council of Ministers, dated 12 July 1979 and entitled "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," provided that in the system of aggregate delivery of manufacturing equipment, production lines, units, and equipment for mechanization, automation, control and monitoring the customer shall settle accounts with the general supplier for the set of equipment as a whole that has been delivered or installed. Up until the date planned for completion of the delivery of the entire set of equipment or its installation the general supplier of the equipment shall be extended bank credit. At the end of the planned period credit financing shall continue, but higher rates of interest shall be collected on the loan.

On 11 April 1980 USSR Stroybank elaborated this decree with "Instructions on Settlement Procedure Between Customers and General Equipment Suppliers for the Work of Installing Equipment for Construction Delivered on an Aggregate Basis" (Instructions).<sup>3</sup> They contain norms which provide that settlement by the customer or general contractor with the general equipment supplier must be



devised so as to take into account the principles set forth in the decree dated 12 July 1979. But USSR Stroybank, not restricting itself to that, has at the same time stated who must conclude a contract with whom for installation of equipment, what its content should be (the reference is to conditions as to quality and date of performance, property liability), and what sort of normative acts the parties are to be guided by in concluding and performing the contract. At the same time USSR Stroybank has provided for the right of the general equipment supplier to enlist specialized organizations to perform work in the installation of equipment.

Thus instructions (Ukazaniya) are essentially performing the role of regulations or rules aimed at regulating the set of relations which come about in organizing equipment installation supervision (shefmontazhnyye raboty). It would seem that the portion of the enactment referred to does not fully correspond to the principal tasks of USSR Stroybank as set forth in its Statute,<sup>4</sup> which took effect at the same time when the Instructions were issued: to supervise the proper and effective use of capital investments, fulfillment of assignments for activation of production capacities, fixed capital, etc. The assignment of monitoring functions does not presuppose the granting of rights to the relevant agency to regulate relations which are the subject of the supervision. The Instructions do not fully correspond to the tasks of USSR Stroybank as set forth in its new Statute.<sup>5</sup> It emphasized that USSR Stroybank has the power to issue instructions and other acts binding upon its clients to implement legislation in effect only in order to carry out the tasks assigned to it. We can thus conclude that there are clear boundaries on the activity of USSR Stroybank in prescribing norms. That activity must extend to relations between USSR Stroybank and its clients which arise in the administration of budget financing, credit financing and settlement, as well as in settlement relations which come about between the parties to a construction contract. The normative competence of USSR Stroybank should not cover other matters arising in relations between the parties to that contract.

In a number of cases an enactment adopted by a particular agency outside the limits of its functional competence diverges in its content from acts issued by other entities concerning those same relations. That was indeed the case with the Instructions of USSR Stroybank. At the moment when they were issued, the Regulation on Aggregate Deliveries of Manufacturing Equipment, Production Lines, Units and Equipment for Mechanization, Automation, Control and Monitoring, adopted by USSR Gosstat, USSR Gosplan and USSR State Committee for Prices on 27 December 1979, was already in effect.<sup>6</sup> This Regulation contains a specific section devoted to supervision of installation of equipment which is part of manufacturing equipment, installations and units. If we compare these enactments, it is not difficult to see that there is a discrepancy in the formulation of the particular norms.

The best way to solve this problem (mindful of its vertical and horizontal aspects) is to include in the regulation (statute) concerning the particular administrative agency an exhaustive list of those normative acts which it may adopt in exercise of its functional competence. Then the administrative agency could adopt acts not mentioned in the list only on the basis of an order to that effect from the USSR Government.

The prescription of norms by USSR Gosarbitrazh [State Arbitration Commission] does not occupy sufficient space in the current practice of issuing departmental normative acts in capital construction. However, thanks to the peculiarities of its organizational structure and the specific nature of the activity it performs USSR Gosarbitrazh could play an important role in guaranteeing the most objective settlement of issues, free of departmental interests. It is also important that the position of USSR Gosarbitrazh in the preparation and approval of normative acts is arrived at on the basis of a summarization of experience in the settlement of numerous disputes between economic entities.

The Regulation on USSR Gosarbitrazh<sup>7</sup> embodied an instruction to the effect that it shall approve standard contracts and other normative acts regulating business activity by order of the USSR Council of Ministers. One can conclude, then, that the USSR Government presupposes extensive participation of USSR Gosarbitrazh in the writing of departmental normative acts concerning the various sectors of the economy. There is hardly any basis for making an exception for capital construction.

It would be advisable if USSR Gosarbitrazh participated in drafting an approving departmental normative acts together with USSR Gosstroy in all cases, and when necessary with USSR Gosplan, USSR Gosstnab, USSR Gosbank, USSR Stroybank and USSR Ministry of Finance as well.

The opinion we have expressed pertains above all to enactments issued under Article 66 of the Bases of Civil Legislation (the reference is to rules or regulations on procedure for concluding and performing construction contracts for installation, repair, startup and other work). The enactments referred to include the Rules on Contracts for Performance of Project Planning and Surveying, approved by USSR Gosstroy, USSR Gosplan and USSR Ministry of Finance on 20 February 1959. They have become considerably outdated in their principal subject matter and above all in that which concerns organization of contractual relations and also the property liability of the parties. For that reason there has long been an urgent need to issue new rules. Should it once again be deemed necessary for the rules to be issued at the departmental level, in our view the order should be issued not only to those agencies which took part in adopting the rules now in effect, but also to USSR Gosarbitrazh.

There is no doubt that the role of USSR Gosarbitrazh in the organization of contractual relations would be enhanced if it were included among the agencies granted authority to jointly issue instructions and clarifications of procedure for enforcement of one of the most important acts--Rules on Construction Contracts for Capital Construction, instructions and clarifications which are binding upon ministries and departments, executive committees of soviets of people's deputies, enterprises, institutions and organizations. At the present time, pursuant to the decree of the USSR Council of Ministers dated 22 March 1974 and entitled "On Enforcement of Rules on Construction Contracts for Capital Construction,"<sup>8</sup> such instructions and clarifications are to be issued by USSR Gosstroy jointly with USSR Gosplan, USSR Stroybank and USSR Gosbank. If in such cases USSR Gosarbitrazh were to join them, this would preclude the possibility of discrepancies arising between those instructions and

clarifications on the one hand and the instructions on the other which USSR Gosarbitrazh issues on problems of enforcing USSR legislation when it resolves economic disputes or settles them in advance of arbitration, instructions which are binding on ministries, state committees, departments, enterprises, institutions and organizations.

Of all the agencies referred to USSR Gosstroy engages in the most extensive prescription of norms. The list of functions of USSR Gosstroy contained in the regulation concerning it allows us to conclude that this agency was set up above all to draft various normative acts.

SNiP [Construction Norms and Rules] 1-1-74, entitled "System of Normative Documents," is playing an important role in improving the enactments of USSR Gosstroy. They define the makeup of the relevant normative acts (documents), the procedure for drafting them, compiling them and submitting them for approval, for their taking effect and publication, for their registration, storage and for information concerning them.

But the SNiP and the norm-prescriptive practice conforming to them are not free of certain shortcomings. For instance, our attention is caught by the great diversity in naming the normative acts enforced by USSR Gosstroy. They include "Construction Norms and Rules," but also "Construction Norms," and "Instructions [Instruktsii]," but also "Instructions [Ukazaniya]," and "Norms," but also "Technical Rules," and so on. This assignment of a name to a particular act is random to a considerable extent. This can be judged from the fact that acts which differ substantially from one another in the subject matter which they regulate, their content, and so on, have identical names ("Instruction on Preparation of Plans and Estimates for Industrial Construction" on the one hand and "Instruction on Technology for Preparation of Refractory Concrete" on the other). At the same time similar relations are regulated by acts which have different names ("Instructions [Ukazaniya]" have been issued on the project planning of collection stations for secondary raw materials, but "Instruction [Instruktsiya]" on the project planning of sanatorium Pioneer camps).

The drafters of SNiP 1-1-74 should also be reproached in our view for not having been thorough or always consistent in systematizing normative acts.

Three groups of enactments are set against "Construction Norms and Regulations": "norms," "rules" and "instructions" [normy, pravila and instruktsii]. A definition is given only of "instructions"--enactments which "set forth technical specifications for the project planning of specific types of enterprises, buildings and installations..." As for "norms" and "rules," it all comes down to mere enumeration of specific enactments. As a result a question remains open of what "norms" and "rules" are, in what respect they differ from one another and from "instructions."

Quite a few of the enactments of USSR Gosstroy are "temporary." The most widespread version are the "temporary instructions [Ukazaniya]." There is no question about the competence to issue such acts. The thing is to determine how the temporary acts differ from regular enactments. The discriminating



feature of temporary enactments is obviously that they have been assigned a maximum period of validity. When that time runs out, such acts lose their legal force and must accordingly be either confirmed or replaced by other enactments. It would be advisable for these features of temporary enactments to be reflected in SNiP 1-1-74.

Not uncommonly enactments of USSR ministries, state committees and departments reproduce in their entirety or partially norms contained in decrees of the USSR Government which were the basis for their issuance. This can be illustrated with the Regulation on Relations of Organizations as General Contractors With Subcontracting Organizations, adopted by USSR Gosstroy and USSR Gosplan on 31 July 1970. More than three-fourths of it coincides in its content with the Rules on Construction Contracts for Capital Construction. The normative acts of USSR Gosstroy devoted to the procedure for acceptance of finished projects, to the preparation of plans and estimates, etc., stand in the same relation to the relevant decrees of the USSR Government. This tends to inflate the departmental normative acts.

The practice we have described is to some extent a type of "duplication," which was adversely appraised in the decrees of the CPSU Central Committee and USSR Council of Ministers: "On Measures To Further Improve Economic Legislation," adopted 25 June 1975; and "On Measures To Further Improve Preparation of Project Plans and Estimates," adopted 30 March 1981.<sup>9</sup> SNiP 1-1-74 itself rightly calls attention to the adverse aspects of the practice in which the enactments of lower agencies reproduce norms adopted at the higher level. It stresses that "departmental and republic normative documents should not contain requirements regulated by all-union normative documents." That same requirement should also be addressed to enactments of USSR Gosstroy itself.

Should this proposal be implemented, in every case one would have to be simultaneously guided by the act of the government and the departmental act issued on the basis of that act. But the difficulties arising in this regard should not be exaggerated. We might confirm this by referring to the example of legal regulation of relations concerning deliveries. Here again there is a system of enactments at two levels: the Regulation on Deliveries of Products for Production and Technical Purposes, the Regulation on Deliveries of Consumer Goods, which regulates general matters, and the special conditions for delivery of relevant types of products (commodities), which reflect specific features.

Such a system, which has been in place since 1959, has been unanimously proclaimed an improvement over the previous system, in which there were basic conditions for delivery of particular types of products and commodities; every one of those basic conditions contained the entire necessary body of norms that applied to the particular type of product (commodity). The fact that in concluding and performing contracts one must take into account the content of the Regulation on Delivery as well as the relevant special delivery conditions has not aroused any sort of objections from practitioners.

In conclusion we should note that further improvement of departmental normative acts concerning capital construction, which might pursue various directions,



will undoubtedly be very important to successful performance of the tasks which have been set for this sector of the economy by the decisions of party congresses and decrees of the CPSU Central Committee and USSR Council of Ministers.

#### FOOTNOTES

1. SP SSSR [Collection of USSR Decrees], No 16, 1975, Item 98.
2. VEDOMOSTI VERKHOVNOGO SOVETA SSSR, No 44, 1981, Item 1184.
3. "Sovershenstvovaniye khozyaystvennogo mekhanizma. Sb. dokumentov" [Improvement of the Economic Mechanism. Collection of Documents], Moscow, Pravda, 1980, p 128.
4. SP SSSR, No 19, 1964, Item 122.
5. SP SSSR, No 30, 1981, Item 176.
6. "Sovershenstvovaniye ...," p 85.
7. SP SSSR, No 16-17, 1980, Item 104.
8. SP SSSR, No 7, 1974, Item 32.
9. SP SSSR, No 14, 1981, Item 84.

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ON PLANNED ACCUMULATION IN CONSTRUCTION

Moscow EKONOMIKA STROITEL'STVA in Russian No 8, Aug 82 (signed to press 23 Jul 82)  
pp 53-58

[Article by M. B. Podnos, Candidate of Economic Sciences: "On Planned Accumulation in Construction"\*]

[Text] Improving the entire economic mechanism essentially means a radical improvement in planning.

Comrade Leonid Il'ich Brezhnev pointed out at the 26th CPSU Congress that "The plan should incontestably be realistic and balanced."

The realism of plans in construction--production, financial, supply and manpower plans--largely depends on the correct determination of the price and estimated cost of the construction process. The correct determination of the construction cost estimate is a reliable basis for reducing expenditures on construction and installation operations and assuring expanded reproduction within the branch through the exploitation of its internal potential.

An important element of the construction cost estimate is planned income as considered in it. That planned income, i.e. the planned accumulation envisaged in the price of the construction process, serves to accumulate a considerable part of the funds allocated for the development of the production facilities of the subcontractor organizations. This is the most stable source for financing the expansion of the construction process.

As shown by data of the USSR TsSU [Central Office of Statistics] ("The USSR National Economy in 1980"), during the 10th Five-Year Plan period the income of subcontractor organizations declined more than 15 percent, whereas during the preceding 5-year period it had increased by a factor of 1.8. Similar changes also took place in the profitability level of the construction process (Table 1). By the end of 1980 this indicator proved to be below its 1970 counterpart. And although the volume of operations performed by subcontractor organizations during that period had increased by a factor of more than 1.5, their income not only failed to increase but even decreased somewhat.

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\*In order of discussion

Table 1.

	1970	1975	1980
Total income of construction sub-contractor organizations, millions of rubles.	4,736	8,566	7,299
Profitability level (income from completed operations in relation to cost of construction and installation operations), %	10.3	15.9	11.4

The profitability indicator of subcontracting operations is a synthetic, aggregative indicator. It reflects various factors of both objective and subjective nature. A decrease in income and in profitability level is primarily due to the underfulfillments of plan targets to reduce the cost of construction and installation operations by the subcontractor organizations. There are many reasons for such underfulfillment but the principal one is the considerable rise in the prices of the products used in construction.

This rise in construction cost and other factors had not been at all compensated for until 1979. The problem had been solved by reducing the plan targets as to income, which resulted in a declining income of the construction ministries (Table 2) and the entire construction subsector.

As indicated by the data in Table 2, the aggregate income of the construction ministries other than the USSR Minmontazhspetsstroy--at which particular price-shaping conditions have been assuring a high profitability for decades--during the periods considered had declined to 1,257 from 1,887.3 million rubles, that is, one-third. Such a situation can in no way be attributed solely to an unsatisfactory performance of construction organizations, since the worsening of financial indicators of performance is characteristic not just of a small group of enterprises but of their overwhelming majority (Table 3).

Explaining the nature of the problem and eliminating its consequences would not automatically lead to its solution. The main thing is to provide in the long run such conditions as would allow for, in the mechanism itself of management, the possibility of the appearance of such situations unless, of course, they are not of a sporadic and random nature.

Construction consumes about 20 percent of the industrial output serving as producer supplies. The rising trend of prices for that part of the output is a reflection of an overall trend and is to some extent due to an objectively conditioned rise in the prices of materials and structural components. It is related to the rapid technological progress in that branch of material production and the steady updating of the variety of building materials, products and structural components.

Table 2

(1) Министерства	(2)	1975 г.		1976 г.	1977 г.	1978 г.	1979 г.	
		фактиче- ский прибыль, млн. р.	(3) % выпол- нения плана	(3) % выполнения плана			(2) фактиче- ский прибыль, млн. р.	(3) % выпол- нения плана
(4) Минтяжстрой СССР		374,6	79,4	91,2	82	84	403	59
thru Минпромстрой СССР		306,3	103,4	96,7	71	65	138	77
Минстрой СССР		268	96,8	41,8	68	62	75	103
(9) Минсельстрой СССР		176,7	76,7	66,2	26	*	-156	*
Минтрансстрой		444,4	105,5	102,3	99,7	98	552	87
Миннефтегазстрой		313,3	100,4	96	84	89	215	71
Минмонтажспецстрой СССР		2176,5	107,4	104,9	102	101	2712	101
(10) Всего по группе		403,8	103,5	96,3	88,3	82	3060	67,3
в том числе Минмонтажспец-		2176,5	107,4	101,9	102	101	2712	101
(11) строй СССР								
(12)* - убытки								

## Key:

1. Ministry
2. Actual income, millions of rubles
3. % of plan fulfillment
4. USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises]
5. USSR Minpromstroy [Ministry of Industrial Construction]
6. USSR Minsel'stoy [Ministry of Rural Construction]
7. Mintransstroy [Ministry of Transport Construction]
8. Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises]
9. USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work]
10. Total for the group
11. Of which: USSR Minmontazhspetsstroy
12. Operates at a loss



Table 3

(1) Министерства	(2) Организации, выполнившие план по финансовым результатам		(5) Организации, не выполнившие план по финансовым результатам		(6) Планово-убыточные организации		(7) Фактически убыточные организации	
	число (3)	% от общего числа (4)	число (3)	% от общего числа (4)	число (3)	% от общего числа (4)	число (3)	% от общего числа (4)
(8) Минтяжстрой СССР	1098 830	64 46	619 968	36 54	92 250	5 14	371 610	22 35
(9) Минпромстрой СССР	1084 922	61 47	707 1023	39 53	130 542	8 28	468 895	26 46
(10) Минстрой СССР	173 103	60 20	643 906	40 50	60 403	4 22	403 791	25 49
(11) Минсельстрой СССР	1738 1500	52 47	1423 1828	48 53	175 1744	6 36	1100 1740	37 51
(12) Минтрансстрой	877 777	69 58	380 607	31 44	12 60	1 4	178 337	14 24
(13) Миннефтегазстрой	379 340	68 55	173 278	31 45	44 116	8 19	147 243	27 39
(14) Минмонтажспецстрой СССР	1556 1553	84 77	298 459	16 23	— —	— 0,2	26 66	1 3

(15) Примечание. В числителе приведены данные за 1975 г., в знаменателе — за 1979 г.

## Key:

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|--|--|
| 1. Ministry  | 10. USSR Minstroy  |
| 2. Organizations that fulfilled the plan financially       | 11. USSR Minsel'stroy  |
| 3. Number  | 12. Mintransstroy  |
| 4. % of total number                                       | 13. Minneftegazstroy   |
| 5. Organizations that did not fulfill the plan financially | 14. USSR Minmontazhpsetsstroy  |
| 6. Organizations with planned losses                       | 15. NOTE: The numerator gives data for 1975 and the denominator for 1979 |
| 7. Organizations actually operating at a loss              |  |
| 8. USSR Mintyazhstroy                                      |  |
| 9. USSR Minpromstroy                                       |  |

In the next 10 years a large number of new building and finishing materials should appear in construction. Their prices will be--especially in the initial period until their mass production is organized--extremely high compared with the prices of their current counterparts. This has to be considered when forecasting price changes in capital construction. The more so considering that the introduction of new (as of 1982) wholesale prices and new (as of 1984) estimate prices will hardly solve the problem once and for all.

It is particularly important, in our opinion, to take into account the forecasts of increases in the prices of products used in construction when substantiating the norms of planned accumulation (there is no common consensus on this matter as yet).

The extent of planned accumulation (5.66 percent of the cost estimate of construction and installation operations), fixed as far back as in 1969, at present does not correspond to the tasks of expanded reproduction within the branch and strengthening of cost-effective operation, and it conflicts with the basic assumptions of the decree of the CPSU Central Committee and the USSR Council of Ministers regarding improvements in the economic mechanism.

As far back as more than 10 years ago many economists and heads of ministries and departments had regarded a 9-10 % planned accumulation as more justified. At that time, the adoption of a different decision was attributable to two causes. First, it had been necessary to offset financially the steadily rising capital investments (had the planned accumulation been set at 9-10 %, the estimated annual cost of construction would have had to be increased by 1.2-1.6 billion rubles). Secondly, the coming economic reform was supposed to contribute to the growth of accumulation within the branch owing to an additional reduction in the cost of construction and installation operations--the adoption of additional pledges as regards the plan of income.

At that time, insufficient allowance had been made for the further development of cost-effective methods and principles of management within the branch. The principal shortcomings of the techniques of calculating the norms of planned accumulation reduced to the following: Primarily, they did not reflect all the forms of expenditures on expanded reproduction within the branch--for example, in practice, no allowance was made for the expenditures on development of science and technology, since they had been mainly financed from the budget funds). Further, certain expenditures, especially assets payments, had been definitely underestimated, being recorded at 1.5 percent of construction cost estimates, which was markedly below the minimum rate even. Yet another error in fixing the proportion of planned accumulation was the failure to make sufficient allowance for the possible rise in the level of the wholesale prices of products used for the expanded reproduction of the construction base. At the time such a rise had been regarded as not a stable trend.

The selection of a low level of planned accumulation had adversely affected the development of cost-effective methods of management and prevented making expenditures on production commensurate with the results of production, while at the same time restricting the possibilities for an effective utilization of the branch's revenues through their redistribution.

When substantiating the norm of planned accumulation that should be followed when drafting new estimate prices, it is possible and necessary to avoid the previously committed oversights.

Currently the proportion of planned accumulation is determined according to two variants (the methodology of calculating norms of planned accumulation in construction has been worked out by the NIIES [Scientific Research Institute of Economics of Construction] of the USSR Gosstroy).

The first variant is based on calculating the branch's contribution to the net income of the economy [net national product] and determining accordingly the branch's share in its distribution. In the second variant allowance is made for the branch's total expenditures on its expanded reproduction. Given the relative closeness of the quantities derived by either method, the problem is solved with relative ease. When a differential arises, the choice of either variant is dictated by the pertinent national policy.

As known, the coefficient of economic effectiveness of capital investments in the "construction" branch at present is thought to be 0.12, compared with 0.15 for the national economy as a whole.\* Comparison of these two quantities shows that the effectiveness of capital investments in the "construction" branch in relation to their effectiveness for the national economy as a whole is  $0.8(0.12/0.15)$ . In other words, the annual yield per ruble of capital investments in the fixed assets of construction is 12 kopecks, compared with 15 kopecks for the national economy as a whole. This ratio serves for a rough calculation of the branch's coefficient of net income (planned accumulation).

Thus, in 1979 the net income generated by the national economy was 202.4 billion rubles, of which 114.1 billion rubles in income and 88.3 billion rubles from the turnover tax.\* At the same time, the cost of the gross national product was 1,028.1 billion rubles. In this case the net income of the "construction" branch would be 15.7% percent.

$$\left( \frac{202.4}{1,028.1} \cdot 0.8 \cdot 100 \right)$$

However, in order to next derive the conditional level (norm) of planned accumulation for the branch, it is necessary to exclude from the branch's net income the part of the revenues from other branches that the centralized budget allots for expanded reproduction within the branch. In the plan for financing the own resources of the construction ministries, that part is incorporated in the form of budget allocations.

In 1979 5,170 million rubles was allocated for financing capital investments in the "construction" branch. Of this total, 3,470 million rubles derived from the branch's own means and 1,700 million from the state budget. Thus, when calculated in percent of the estimated cost of construction and installation operations, the norm of planned accumulation  $N_{pa}$  will be:

$$N_{pa} = \frac{15.7 \cdot 72.2}{100} - 1.7 : 72.2 \cdot 100 = 13.3\%.$$

\*All calculations are based on figures in the statistical yearbook "Narodnoye khozyaystvo SSSR v 1979" [The USSR National Economy in 1979] (Moscow, Statistika, 1980). The net income statistic does not include the net income of kolkhozes.

In other words, to fulfill a volume of construction and installation operations equivalent in financial terms to 72.2 billion rubles, in 1979 the branch should have derived a planned accumulation of 11.3 billion rubles in order to assure its own expanded reproduction, given the magnitude of its net income. However, owing to the redistribution of income among branches, the construction branch received from the state 1.7 billion rubles. Thus, so that the branch may have the necessary funds for its expanded reproduction as a result of its own performance, the sales prices of its output should be predicated on an accumulation of 9.6 billion rubles (11.3 billion rubles minus 1.7 billion). That would be 13.3 percent ( $9.6 : 7.2 \cdot 100$ ) of the volume of construction and installation operations. Such a calculational technique serves--despite its somewhat conditional nature--to determine the norm of planned accumulation in construction "from the top down," that is, in accordance with the branch's contribution to the national economy.

A different method of calculating the norm of planned accumulation is used when the branch's needs serve as the starting point, and it is no less justified. It makes it possible in the long run to solve the important problem of converting, first, the middle and, later, the upper levels of branch management to complete cost effectiveness. When the norm of planned accumulation is computed by this method, it is important to allow maximally for the nature of the expenditures on expanded reproduction (which had not been done when substantiating the norms of planned accumulation introduced in 1969). They include such expenditures--planned in the computed balance of income and outgo when distributing income--as: payments to the budget for fixed assets, interest paid on loans, deductions for incentive funds, increase in circulating assets, expenditures on the training and advanced training of cadres, the financing of scientific research and technological development, and the reimbursement of part of expenditures on social and cultural services.

However, not all of these types of expenditures should be completely offset from planned accumulation considered in the price of construction production. Some expenditures can and should be defrayed by reducing the cost of construction and installation operations. In our opinion, such expenditures include wages and the payment of interest on loans (partially, when norm-exceeding assets are available), outlays on capital investments, and expenditures on the upkeep of housing and socio-cultural buildings and establishments (also partially, whenever the needs are, owing to the demographic situation, greater than for the branch as a whole).

But it should also be borne in mind that the savings derived from reducing the cost of construction and installation operations are used by certain subcontractor organizations to offset losses entailed when the conditions of construction differ from the average. These average conditions should be fully considered in the norm of planned accumulation. The methodology of planning the aforementioned expenditure types is sufficiently well-known. It is usually based on the use of the weighted arithmetical mean and extrapolation (the mean rate of change in the indicator is computed for 3-5 preceding years and the result is extrapolated to the year in which the norm is to be introduced). In our opinion, however, it is neither possible nor permissible to apply it in every individual case.

This primarily concerns payments for fixed assets. During the 10th Five-Year Plan period, owing to the decrease in the profitability and income of construction pro-



duction, a large number of subcontractor organizations was relieved of the obligation to pay for fixed assets. Hence, calculations of the mean may markedly distort the picture. Moreover, it should be borne in mind that, pursuant to the decisions to improve the managerial mechanism, payments for fixed assets are, as a rule, set at the level of 6 percent. This requires revising the calculations. (If planned accumulations were to reflect the current level of payments for fixed assets, the prices for the 10-year period ahead would result in an inefficient utilization of these assets; besides, whatever the level of these payments, they all become part of the state's revenues.)

When determining the extent of payments of interest on loans for uncompleted construction, we believe that the starting premise should not be the minimum interest rate but the average one, i.e. allowance should be made for the average duration of the construction process in this country, as well as for its attendant deviations, during the period of application of new prices, and also for the feasibility of the planned (normative) construction schedules.

It should be considered that the decline in the overall income of the construction branch in the last 2-3 years has been accompanied by a decline in the monies set aside for incentive funds. Hence, when calculating these deductions, in order to preclude errors, the time lag should be taken into account and data for 1973-1978 should be used (this being the period during which the size of incentive funds had been growing owing to a growth in accumulation).

When determining the volume of liquid capital, in our opinion, the applicable norm should not be used because, owing to the ongoing decrease in that capital each year, upon consultation with the USSR Ministry of Finance as regards the computed balance of income and expenditures (with allowance for the task to shorten the turnover period of liquid capital), at most construction ministries the pertinent norms are incommensurate with the needs (own liquid capital is only a small fraction of the total liquid capital available to these ministries). Externally, the shortage of financial resources is not as perceptible. Resorting to loans in order to augment own liquid capital adversely affects the financial condition of subcontractor organizations and undermines branch-wide cost effectiveness, since repayments of these loans have to be deducted from the income available for distribution. The point is that, since a large part of marketed construction production is completed behind the normative schedules, the cost of loans proves to be greater than planned by a factor of 7-8 (instead of 0.5 percent, 4 percent). Hence, it would be more correct to adopt as the norm of own liquid capital the norm that actually prevailed in the construction ministries during the 1975-1980 period, namely, 21-23 percent of cost estimates. Here, allowance should also be made for the actual shortening of the turnover cycle of liquid capital during that period.

When planning the outlays on the regular and advanced training of personnel, allowance should be made for the rising cost of retraining, due to the shortage of manpower resources in the 1980s. Estimates by experts show that these expenditures will increase at a rate 15-20 percent higher than during the years 1975-1980.

The currently effective norms of planned accumulation make absolutely no allowance for outlays on research. This had been justified at the time when these norms were originally introduced, because then an overwhelming part of scientific research within the

branch was financed from the [state] budget. But the situation changed once the Belorussian SSR Minpromstroy had converted to new methods of management planning in 1975. Spending on research began to be financed from the branch's own resources--at first in some ministries and departments and then in the others. Pursuant to the decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism in all ministries and departments, as known, a unified fund for the development of science and technology had to be set up. All this necessitates including the cost of research in the price of construction production (in planned accumulation) and reimbursing customers for such expenditures.

The deductions to the fund for the development of science and technology currently reach 0.6 percent of the cost estimates of subcontract operations. And since their volume will have reached 80-81 billion rubles when the new estimate prices are introduced, 480-500 million rubles will have to be included for this purpose in total estimated construction cost.

When planning the volume of funds needed to offset part of the expenditures on social and cultural services, it should be considered that the actual expenditures on the upkeep of housing and cultural and consumer-service buildings have so far been planned at a higher level than the income derived in accordance with the effective norms and fee rates. Hence we believe that the volume of these expenditures in planned accumulation should be preserved within the limits specified in the effective norms of planned accumulation. Any increases in outlays on these purposes in excess of these limits should be offset by reducing the cost of construction and installation operations as well as from the fund for socio-cultural measures.

An important factor which has definitely to be considered in calculations of planned accumulation is the forecast increase in wholesale prices for the effective period of estimate prices. The calculated norms of planned accumulation, as substantiated and computed by the NIIES of the USSR Gosstroy, allow only for an 18-19 percent increase in the prices of the materials, structural components and elements and production of construction. Actually however, price increases for discrete types of products used in construction have resulted in a 30-percent rise in their cost during the 10th Five-Year Plan period.

Data from different institutes on the normative size of the branch's expenditures on expanded reproduction that should be considered in planned accumulation when introducing new estimate prices are presented in Table 4. As seen from this table, the planned accumulation norm determined by the NIIOUS [Scientific Research Institute of Organization and Management in Construction] as the total outlays on expanded reproduction is about 2 percent higher than the norm derived on the basis of the branch's contribution to the generation of net national income. The higher (by 4.2 percent) level of the norm we propose as compared with the NIIES norm is attributable to the fact that the latter norm does not fully allow for expenditures on research and is based on the mean of payments for fixed assets made over 5 previous years and that it moreover underestimates loan repayments and the norm of own liquid capital of the branch. Since the framework of cost-effectiveness relations within which the agencies managing construction operate is as yet extremely narrow, and the cost effectiveness system itself is underdeveloped, we believe that estimate prices should be calculated on the basis of the lower value of the norm of planned accumulation--13.3 percent.

Table 4.

(1) Статья затрат, подлежащие возмещению за счет плановых накоплений	(2) По расчетам НИИОУС	(3) По расчетам НИИЭС	
		(4) Сумма в объеме СМР на 1984 г., млрд. р.	(5) % от смет- ной стои- мости СМР
(6) Плата за фонды	4,25	5	2,83
(7) Проценты за кредит	1,61	2	0,81
(8) Отчисления в фонды экономического стимулирования	3,62	4,5	3,24
(9) Средства для прироста собственных оборотных средств	1,21	1,5	0,74
(10) Расходы на науку	0,42	0,5	—
(11) Расходы на подготовку кадров и повышение квалифи- кации	0,32	0,4	0,2
(12) Расходы на жилье и культурно-бытовые здания	1,04	1,3	0,98
(13) Итого	12,47	15,2	8,85

Key:

1. Expenditure items subject to reimbursement from planned accumulation
2. NIIOS calculations
3. NIIES calculations
4. Amount in relation to volume of SMR [construction and installation operations], billions of rubles
5. % of estimated cost of SMR
6. Payment for fixed assets
7. Interest on loans
8. Deduction to incentive funds
9. Deductions for augmenting own liquid capital
10. Expenditures on research
11. Expenditures on regular and advanced training of personnel
12. Expenditures on housing and cultural and consumer-service buildings
13. total

All the figures presented above do not allow for the expenditures on financing capital investments. This is not accidental. The point is that the "construction" branch has received from the [state] budget 2 billion rubles for its expanded reproduction (mostly for the construction of facilities in relatively undeveloped regions as well as in regions of concentrated construction) and is a major taxpayer at the same time: of the total of 6.26 billion rubles in surplus income paid by that branch to the state budget, payments for fixed assets amounted to 1.4 billion and payments of income surplus, 3.77 billion. Thus, even when payments for fixed assets are doubled, the branch still could afford to finance with its own planned resources the missing volume of capital investments. Of course, these calculations are somewhat conditional, since the actually used values of accumulation by the branch reflect not only planned accumulation but also reductions in the cost of construction and installation operations. But this does not substantially affect the main point we are making.

Would not the adoption of the calculational approach proposed above result in a marked decrease in the reproductive potential of the national economy considering that by 1984 payments to subcontractors for the same volume of operations would have to be increased 6 billion rubles ( $80.5 \cdot 13.3 - 80.5 \cdot 5.66$ )? In our opinion, this should not happen. If the basic planned targets are accomplished, that 6 billion rubles will be additionally accumulated in the budget: owing to the distributive function of fiscal

operations, the budget will receive 2.85 billion rubles as a result of the increase in payments for fixed assets (4.25—1.4) plus 1.3 billion rubles as a result of the increase in interest payments on loans (1.61—0.31). These conclusions were based on statistics for 1979 (when the payments for fixed assets totaled 1.4 billion rubles and payments of interest on loans, 0.31 billion). A large part of funds will, moreover, be additionally accumulated owing to the increase in net income [surplus income] at efficiently operating organizations as a result of the rise in profitability of production and increase in the volume of the income of the construction branch. Some of these funds will, of course, be spent on additional material incentives, since the size of the incentive fund will increase. Our calculations show that, all other things remaining equal, an increase in planned accumulation to the level of 13.3 percent will cause the incentive fund to increase to 0.8 billion rubles. However, in practice that fund can be utilized only upon achieving the end-results entailed in the comprehensive restructuring of the machinery of management. In this connection, one-half of the monies for the incentive fund should be derived from the fulfillment of plan targets as regards a rise in labor productivity and the other half, from the fulfillment of the target as regards income (as limited to the income derived from the sales of commercial construction production).

A correct determination of the norms of planned accumulation in construction would make it possible to compare more accurately the outlays on and results of production as well as to utilize more effectively such an important instrument as the economic stimulation of production and the material stimulation of labor. Conditions would arise for completely cost-effective operation of the middle levels of construction management and hence also for a fuller application of cost-effective management techniques. A stable basis for the financial activity of the construction ministries would be created. As a result, their income and hence also revenues to the state budget will increase.

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## CONSTRUCTION PLANNING AND ECONOMICS

### NEW STATUTE ON INCENTIVE FUND IN CONSTRUCTION INDUSTRY

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[Statute: "Formation of the Material Incentive Fund and the Fund for Sociocultural Measures and Housing Construction in 1981-1985 at Planned-Loss and Low-Profit Construction-Installation Organizations"]

[Text] On 10 June 1982 the interdepartmental commission of USSR Gosplan on questions of the use of new methods for planning and economic stimulation issued Protocol No 385. By this protocol the commission approved the "Statute on Formation of the Material Incentive Fund and the Fund for Sociocultural Measures and Housing Construction in 1981-1985 at Planned-Loss and Low-Profit Construction-Installation Organizations."<sup>1</sup> This statute was worked out by the USSR Gosplan Division of Improvement of Planning and Economic Stimulation and submitted by a working group of the interdepartmental commission of the USSR Gosplan Division of Construction and the Construction Industry. The statute, whose complete text is published below, went into effect on 1 July 1982.

The present Statute was developed with due regard for Decree No 695 of the CPSU Central Committee and USSR Council of Ministers adopted on 12 July 1979 and entitled "Improving Planning and Strengthening the Influence of the Economic Mechanism on Raising Production Efficiency and Work Quality." The Statute applies to planned-loss and low-profitability organizations switched to the new system of planning and economic stimulation.<sup>2</sup>

<sup>1</sup>Construction-installation organizations include construction-installation production associations operating on the basis of the appropriate statute, trusts, and other construction-installation organizations equivalent to them to which the Statute on the Socialist State Production Enterprise applies. Hereafter they are referred to as "organizations."

<sup>2</sup>Low-profitability organizations are those at which profit is inadequate to make the payment for fixed and working capital, planned interest payments on bank credit, and planned payments for formation of economic incentive funds.

The Statute envisions the following principles of formation of incentive funds.

For planned-loss and low-profitability organizations, absolute amounts of incentive funds are established along with the plan for the primary indicators of the 11th Five-Year Plan. These incentive amounts are differentiated by years of the five-year plan within the limits of the total amount of incentive funds determined in calculations for the five-year plan for the ministry or department as a whole.

When establishing the material incentive fund for planned-loss and low-profitability organizations by years of the five-year plan advantages in incentive must be created for those organizations which adopt stepped-up plan assignments, including assignments to reduce construction time, raise labor productivity, and lower the prime cost of construction-installation work.

When establishing the planned sum of the fund for socioculture measures and housing construction consideration must be given to the extent to which the employees of the organization are provided with housing, preschool institutions for children, cultural-domestic institutions, and the like.

The amounts of norms for increasing and decreasing these funds are established at the same time as the amounts of the incentive funds for planned-loss and low-profitability organizations.

The fund-formation indicators adopted for planned-loss and low-profitability organizations are: growth in labor productivity; level of loss<sup>3</sup> (level of profitability<sup>4</sup> for low-profit organizations).

The planned sum of losses by years of the five-year plan is also established in the five-year plan for planned-loss organizations (for low-profit organizations the sum of profit is planned).

The sums of incentive funds are increased or decreased accordingly as planned-loss and low-profit organizations improve or worsen fund-formation indicators in the draft annual plan compared to the five-year plan assignment for the particular year and also depending on actual fulfillment of the plan.

The Statute establishes incentive fund formation principles that are uniform for all ministries and departments that have construction-installation organizations.

1. Procedure for Establishing the Amounts of Incentive Funds and Norms for Increasing and Decreasing Them.

1. The amount of the material incentive fund for planned-loss and low-profitability organizations differentiated by years of the five-year plan is

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<sup>3</sup>The level of loss is the ratio of the total losses to the volume of commodity construction output performed by the organization's own personnel.

<sup>4</sup>Profitability is the ratio of the sum of balance profit to the volume of commodity construction output performed by the organization's own personnel.

established in the five-year plan by the ministry or department and middle-level management body<sup>5</sup> within the limits of the total amount of this fund determined for it in calculations for the five-year plan.

2. The ministries, departments, and middle-level management bodies<sup>6</sup> can, within the limits of the sums of the material incentive fund determined for them in calculations for the five-year plan as a whole and for the corresponding year, establish larger amounts of this fund if the proportion of work on reconstruction and technical-reequipping of existing enterprises in the volume of commodity construction output of these organizations is more than 30 percent.

3. The norms for increasing or decreasing the material incentive fund of planned-loss and low-profit organizations are set at the following levels for 1981-1985:

- the norm of increase or decrease in the material incentive fund for each percentage point of increase or decrease in the growth rate of labor productivity - in the amount of two percent of the sum of the material incentive fund according to the plan for 1980.<sup>7</sup> In this case growth in labor productivity is taken as a running total from the start of the five-year plan (in percentage of the report for 1980);
- the norm of increase or decrease in the material incentive fund for each one-tenth of a percentage point by which the level of loss (or profitability) is lowered (or increases) - in the amount of 0.5 percent of the sum of the material incentive fund according to the plan for 1980.

4. In cases where an organization's volume of commodity construction output in certain years of the five-year plan is not more than 30 percent of the total volume of construction-installation work an advance expenditure of material incentive funds is made. The sum of the advance from the material incentive fund

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<sup>5</sup>The middle-level management bodies are the USSR-republic construction ministries of the Union republics, the main administrations of construction of the Union republics, all-Union and republic construction-installation associations, and territorial administrations and main administrations of construction.

<sup>6</sup>Hereafter ministries, departments, and middle-level management bodies are called higher-ranking organizations.

<sup>7</sup>In cases of a significant change (more than 20 percent) in the number of employees of an organization in comparison with 1980 and also when no material incentive fund was planned for the base year, the norm is applied to the sum of this fund for the corresponding year of the five-year plan.

in the plan for the indicated year is taken as 60 percent of the average annual size of this fund according to calculations for the five-year plan. In this connection the amount of the material incentive fund for the remaining years of the five-year plan is set with due regard for the need to make up for the sum of this fund not considered during advance use.

5. Norms for formation of the fund for sociocultural measures and housing construction are established for planned-loss and low-profit organizations by the higher-ranking organization. This is done by years in the five-year plan in the amount of 40-60 percent of the planned material incentive fund depending on the extent to which the organizations provide employees with housing, preschool institutions for children, cultural-domestic institutions, and the like.

6. The amounts of material incentive funds and norms for formation of the fund for sociocultural measures and housing construction are set by agreement (with the participation) of the appropriate trade union committees and councils. The planned sums of material incentive funds are envisioned in the organization balance of income and expenditures (financial plan).

7. The incentive funds established by years in the five-year plan may be changed by the higher-ranking organization in cases of refining assignments of the five-year plan by the established procedure.

The amounts of incentive funds established in the plan do not change when the plan for fund-formation indicators is changed in connection with the introduction of new estimate prices by which accounts for production capacities and facilities fully built and accepted by clients are paid, new prices and rates for output and services produced and consumed, and new norms for depreciation deductions, or with an increase in salaries and wages and social insurance rates.

## II. Procedure for Planning Incentive Funds in the Annual Plan

8. The size of the material incentive plan in the plan for the next year is determined by the following procedure:

- when adopting the annual plan for planned-loss and low-profit organizations whose assignments for fund-formation indicators correspond to the five-year plan for the next year, the material incentive fund is established at the level of this fund determined in the five-year plan;
- when the fund-formation indicators in the annual plan improve (or worsen) compared to the indicators established in the five-year plan for the corresponding year, the sum of the material incentive fund envisioned in the five-year plan is increased (or decreased).

In this case growth in labor productivity in the annual plan is computed by running total from the start of the five-year plan (in percentage of the report for 1980).



9. When planned-loss and low-profit organizations adopt counter plans that improve the assignments of the five-year plan for the next year and these plans are ratified by the higher-ranking organization, the increase in the amount of the material incentive fund envisioned in the five-year plan is made according to the norms established in Part 3 of the present Statute, which are increased by doubling.

This increase is covered out of and within the limits of the additional reduction in losses (additional profits) envisioned in the counterplan compared to the amount established in the five-year plan for the corresponding year, or out of the reserve (centralized fund) of the higher-ranking organization if there is no such decrease in losses.

10. When planned-loss and low-profit organizations adopt annual plans that worsen the assignments of the five-year plan for the corresponding year with respect to fund-formation indicators, the sum of the material incentive fund for these organizations as envisioned in the five-year plan is reduced according to the norms established in Part 3 of the present Statute, increased by 50 percent.

11. The amount of the increase (or decrease) in the material incentive fund during ratification of annual plans is determined by multiplying the amount of the increase (reduction) of each fund-formation indicator in the annual plan compared to the five-year plan for the corresponding norm.

Appendix 1 of the present Statute gives an example of calculating the material incentive fund in the annual plan.

12. The size of the fund for sociocultural measures and housing construction in annual plans is determined by multiplying the norm established in conformity with Part 5 of the present Statute by the amount of the material incentive calculated by the procedure envisioned in Parts 8, 9, and 10 of the present Statute.

13. Incentive funds are envisioned in the financial plan and distributed to planned-loss and low-profit organizations by quarters of the year with due regard for quarterly distribution of commodity construction output, the wages fund, or another indicator at the discretion of the higher-ranking organization.

14. When the plan assignments for fund-formation indicators of a planned-loss or low-profit organization are changed by established procedures during the year the sum of the incentive fund envisioned in the financial plan is changed at the same time according to the norms established in Parts 3 and 5 of the present Statute.

These funds are increased out of the reserve capital (centralized fund) for incentive funds of the higher-ranking organizations.

15. In cases where, according to the plan of the construction-installation organization, the volume of commodity construction output in certain quarters is not more than 30 percent of the total volume of contract work of the corresponding quarter, an advance expenditure of the material incentive fund is made. In this case the total amount of capital used for the advance expenditure in each such

quarter must not exceed 15 percent of the annual material incentive fund of the organization. This capital should be reimbursed in subsequent quarters of the particular period.

### III. Procedure for Deductions to Incentive Funds During the Year

16. Organizations make deductions to the material incentive fund each quarter. When the plan for fund-formation indicators (including the indicators of counterplans) is fulfilled considered in running total from the beginning of the year (quarter, half-year, nine months, and year), deductions are made in the amounts envisioned in the annual financial plan for the corresponding period.

17. When the plan for fund-formation indicators (including indicators of counterplans) is overfulfilled, additional deductions are made to the material incentive fund using the norms (not raised for the adoption of counterplans) and established by Part 3 of the present Statute, lowered by at least 30 percent.

18. Where the plan for fund-formation indicators is not fulfilled deductions to the material incentive fund are lowered as follows:

- a. for organizations which have counterplans, with respect to failure to fulfill counterplans deductions are made at the increased norms established to stimulate counterplans in Part 9 of the present Statute. For the rest of the underfulfillment of the plan the material incentive fund is reduced using the norms established in Part 3 of the present Statute increased by at least 30 percent;
- b. for organizations which do not have counterplans, deductions are made at the norms established in Part 3 of the present Statute increased by at least 30 percent.

19. The amounts of the decrease (increase) in norms for deductions to the material incentive fund envisioned in Parts 17 and 18 of the present Statute (correction coefficients) for overfulfillment (underfulfillment) of the plan for fund-formation indicators are established by the higher-ranking organization in agreement with the appropriate trade union committee.

20. When the level of loss (profitability) goes down in connection with introduction of production capacities and facilities ahead of schedule (whose introduction was envisioned according to the plan for periods following the given quarter), correction coefficients to the norm are not employed.

21. Where there is overfulfillment (or underfulfillment) of the plan for growth in labor productivity the increase (decrease) in the sum of the material incentive fund is made according to norms as a percentage of the sum of the material incentive fund according to plan for 1980 for the period corresponding to that which has passed since the beginning of work in the current year, while applicable to a decrease (or increase) in the level of loss (profitability) it is done by norms as a percentage of the annual material incentive fund according to the plan for 1980.

Depending on fulfillment of the plan the material incentive fund is increased (or decreased) for each indicator separately.

22. When determining the level of loss (profitability) to be accepted for determining the amount of deductions to the material incentive fund, the actual sum of losses (profit) is adjusted by the sum of savings (profit) which was not taken into account in determining the planned amount of this fund:

- the savings (profit) received during voluntary communist work days;
- the additional savings (profit) received from taking organizational-technical steps and directed to replenishing the shortage of the organization's own working capital;
- other savings (profit) with a special-purpose designation;
- the sum of interest payments for bank credit beyond the plan, including higher interest paid because of violations of schedules for turning over production capacities and facilities (work projects) to clients.

23. In cases where labor productivity in the report period is lower than the level of labor productivity in the base period, actual deductions to the material incentive fund are reduced by 50 percent of the planned sum of this fund for this period, except for cases where a decrease in labor productivity is envisioned in the plan.

Appendix 2 to the present Statute gives an example of determining the amount of deductions to the material incentive fund.

24. In cases of violation of the schedule for launching a production capacity or facility (or violation of the schedule for turning over sets of special construction and installation jobs to the general contractor by a specialized subcontracting organization whose plan does not contemplate the introduction of production capacities and facilities), the amount of deductions to the material incentive fund related to the particular production capacity or facility (set of special construction and installation jobs) is reduced by 10 percent. This money is transferred to the reserve (centralized fund) of the higher-ranking organization and used for supplementary incentive for construction-installation organizations that insure the launching of production capacities and facilities ahead of schedule (turning over sets of special construction and installation jobs to the general contractor ahead of schedule).

The amount of the material incentive fund related to the particular production capacity or facility is determined from the planned sum of the fund for the year for the construction-installation organization proportional to the share of the volume of commodity construction output performed by the organization's own personnel on the production capacity or facility in the total amount of commodity construction output performed by the organization's own personnel according to the plan for the year.

Appendix 3 gives an example of calculating the decrease in deductions to the material incentive fund for violation of the schedule for launching a production capacity or facility.

25. Additional deductions are made (or a decrease in deductions is made) to the fund for sociocultural measures and housing construction in the case of over-fulfillment (or underfulfillment) of the plan for fund-formation indicators. In this case the amount of the additional deduction (decrease in deductions) is determined by multiplying the norm established in conformity with Part 5 of the present Statute by the amount of additional deductions (decrease in deductions) for the material incentive fund.

26. Additional deductions to incentive funds are made:

- a. out of and within the limits of an actual decrease in losses compared to the plan at planned-loss organizations;
- b. within the limits of the balance of above-plan profit calculated by the established procedure in low-profit organizations.

27. The incentive funds of construction-installation organizations are formed by the established procedure in a reduced amount in the case of failure to fulfill the plan for fund-formation indicators. In this case the minimum amount of incentive funds cannot be less than 40 percent of the planned sum of funds for the period from the start of the year.

The total sum of incentive funds (including minimum deductions for particular quarters) in the case for failure to fulfill the plans for fund-formation indicators in running total from the start of the year (quarter, half-year, nine months, and year) cannot exceed the sum of these funds envisioned by plans for this period. The sums of the material incentive fund calculated in this case are used for current bonus payments to the collectives of production units who did fulfill the plan.

28. The unused savings on the wages fund (within the limits of above-plan reduction in losses or above-plan profit) received compared to the established norm or planned wages fund is transferred to the material incentive fund of the organization on the condition of fulfillment of the plan for introduction of production capacities and facilities (sets of special construction and installation jobs for subcontracting organizations, the plan for volume of commodity construction output by the organization's own personnel (or volume of construction-installation work if this indicator is not in the plan), and assignments for growth in labor productivity.

Where the wages fund is overexpended the money in the material incentive fund is used to cover (within the limits of the savings of wages fund transferred to this fund during the previous year).



29. Sums received from clients for bonus payments to employees for introducing production capacities and facilities on time or ahead of schedule, part of the profit received by construction-installation organizations for shortening scheduled launching times of production capacities compared to established norms (the part subject to inclusion in incentive funds in established amounts), supplements to bonus payments for work in northern regions in amounts actually compensated for by the client, and the amounts of bonuses paid to workers according to the wages fund are included in the material incentive fund.

In addition, other incentive capital based on special bonus systems used for a special purpose are included in this fund in the established manner.

30. Planned-loss and low-profit organizations spend incentive funds in conformity with Parts 33-39 of the Fundamental Principles of Formation and Expenditure of the Material Incentive Fund and Fund for Sociocultural Measures and Housing Construction (the Incentive Funds) for 1981-1985 in Construction (Subcontracting Activity) as approved by decision of the Interdepartmental Commission of USSR Gosplan on 10 June 1980 (Protocol No 358-b).

Appendix 1. Example of Calculation of the Material Incentive Fund in the Annual Plan of a Planned-Loss Production Construction-Installation Association (or Trust)

Name of Indicator	Unit of Measure	Amount of Norm
1. Norms		
Norms of Increase in the Material Incentive Fund for Exceeding Assignments of the Five-Year Plan for the Particular Year:		
1.1. For Each Percentage Point over the Growth Rate of Labor Productivity	As % of planned material incentive fund for 1980	4(2 x 2)
1.2. For Each One-Tenth of a Percentage Point of Decrease in the Level of Loss	" "	1(0.5 x 2)
Norms of Decrease in the Material Incentive Fund where Assignments Below Those Established by the Five-Year Plan for the Given Year Are Adopted:		
1.3. For Each Percentage Point of Decrease in the Growth Rate of Labor Productivity	" "	3(2 x 1.5)
1.4. For Each One-Tenth of a Percentage Point above the Loss Level.	" "	0.75(0.5 x 1.5)

[Table continued, next page]

[Table continued]

Name of Indicator	Unit of Measure	Ratified in Five-Year Plan for 1982	Draft Plan for 1983
<b>2. Initial Data</b>			
2.1. Volume of Commodity Construction Output	Millions of rubles	51	51
2.2. Growth in Labor Productivity by Running Total	As % of report for 1980	112.5	113.3
2.3. Deviation of Annual Plan from Assignment of Five-Year Plan for this Indicator	In percentage points	-	+0.8(113.3-112.5)
2.4. Sum of Losses	Millions of rubles	1.58	1.38
2.5. Level of Loss (2.4/2.1 x 100)	In %	3.1	2.7
2.6. Decrease in Level of Loss by Adoption of Counterplan	In percentage points	-	0.4(3.1-2.7)
2.7. Material Incentive Fund in Plan for 1980 - 780,000 Rubles	-	-	-
2.8. Material Incentive Fund According to Five-Year Plan	Thousands of rubles	815	-

Determination of the Amount of the Material Incentive Fund for 1983 Based on Assignments Adopted in Annual Plan for Fund-Formation Indicators and Established Norms:

3.1. The sum of increase in the material incentive fund for 1983 compared to the amount established in the five-year plan for this year:

3.1.1. By adoption of a counterplan to increase growth in labor productivity (line 2.3 x line 2.7 x line 1.1/100):

$$\frac{0.8 \times 780 \times 4}{100} = 24,960 \text{ rubles.}$$

3.1.2. By reducing levels of loss adopted in counterplan (line 2.6 x 2.7 x 1.2/100):

$$\frac{0.4 \times 10 \times 780 \times 1}{100} = 31,200 \text{ rubles}$$

3.2 Total sum of material incentive fund according to 1983 plan (line 2.8 + line 3.1.1 + line 3.1.2):

$$815,000 + 24,960 + 31,200 = 871,160 \text{ rubles.}$$

Appendix 2. Example of Calculation of Deductions to Material Incentive Fund for Planned-Loss Production Construction-Installation Association in 1983

1. Norms of Increase (Decrease) in Deductions Taking Account of Amounts of Decrease (Increase) of Them Established for the Organization

- 1.1 — For each percentage point by which the growth rate of labor productivity exceeds the plan ( $2 \times 70/100$ ) — 1.4 percent of the planned material incentive fund for the corresponding period of 1980.
- 1.2 — For each one-tenth of a percent of decrease in level of loss ( $0.5 \times 60/100$ ) — 0.3 percent of the planned 1980 material incentive fund (established amount of decrease — 40 percent).
- 1.3 — For each percentage point of decrease in growth rate of labor productivity ( $2 \times 10.100$ ) — 3 percent of the planned material incentive fund for the corresponding period of 1980 (established amount of increase — 50 percent).
- 1.4 — For each one-tenth of a percent of increase in the level of loss ( $0.5 \times 140/100$ ) — 0.7 percent of the planned material incentive fund for 1980 (established amount of increase — 40 percent).

II. Initial Data

Name of Indicator	Unit of Measure	First Six Months			Nine Months		
		Plan	Report	Deviation	Plan	Report	Deviation
2.1. Volume of Commodity Construction Output	millions of rubles	26	20.1	-5.9	38	38	0
2.2. Fulfillment of Assignment for Growth in Labor Productivity	%	110.5	109.6	-0.9	112.5	113.5	+1
2.3. Sum of Losses	millions of rubles	0.8	0.62	-0.18	1	1.163	+0.163
2.4. Level of Loss (2.3/2.1) x 100)	%	3.08	3.08	0	2.63	3.06	+0.43
2.5. Material Incentive Fund According to 1980 Plans for Period from Start of Year	thousands of rubles	340	-	-	600	-	-

[Table continued, next page]

## II. Initial Data (table continued)

Name of Indicator	Unit of Measure	First Six Months			Nine Months		
		Plan	Report	Deviation	Plan	Report	Deviation
2.6. Deductions to thousands of 420		-	-		633	-	-
Material In-	rubles						
centive Fund							
According to							
Plan from							
Start of Year							

## III. Calculation of Deductions to Material Incentive Fund

	Six Months	Nine Months
3.1. Change in Deductions to Material Incentive Fund Depending on Fulfillment of Plan:		
3.1.1. For Overfulfillment of the Plan for Growth Rate of Labor Productivity	-	$\frac{1 \times 1.4 \times 600}{100} = 8,400$ rubles (line 2.2 column 9 x line 1.1 x line 2.5 column 7/100)
3.1.2. For Failure To Fulfill the Plan for Growth in Labor Productivity in the Part Related to the Counterplan	$\frac{0.8 \times 340 \times 4}{100} = -10,880$ rubles (line 2.3, 4* x line 2.5 column 4 x line 1.1*/100)	-
3.1.3. For Underfulfillment of Plan for Growth Rate of Labor Productivity in Remainder of Plan	$\frac{(-0.9-0.8) \times 340 \times 3}{100} = -1,020$ rubles (line 2.2 column 6 - line 2.3 column 4* x line 2.5 column 4 x line 1.3/100)	-
3.1.4. For Exceeding the Level of Loss in the Part Related to the Counterplan	-	$\frac{0.4 \times 10 \times 780 \times 1}{100} = -31,200$ rubles (line 2.6 column 4* x 10 x line 2.7* x line 1.2*/100)

\* Data from Appendix 1.

[Table continued, next page]



### III. Calculation of Deductions to Material Incentive Fund (table continued)

	Six Months	Nine Months
3.1.5. For Exceeding the Level of Loss in the Rest of the Plan	-	$\frac{(0.43-0.4) \times 10 \times 780 \times 0.7}{100} =$ <p>-1,640 rubles</p> <p>(line 2.4 - line 2.6 column 4* x 10 x line 2.7* x line 1.4/100)</p>
3.2. Decrease in Deductions in Connection with Violation of Established Schedule for Launching Production Capacity	$\frac{6 \times 100}{51} = -11.76\%$ <p>(line 2.1 column 6/line 2.1 column 3* x 100)</p> $\frac{871.16 \times 11.76}{100} =$ <p>102,450 rubles</p> <p>(line 3.2* x 11.76/100)</p> $\frac{102.45 \times 10}{100} =$ <p>- 10,250 rubles</p>	
3.3. Total Increase or Decrease in Deductions to Material Incentive Fund	$-10,880 - 1,020 - 10,250 =$ <p>-22,150 rubles</p> <p>(line 3.1.2 column 2 + line 3.1.3 column 2 + line 3.2 column 2)</p>	$+ 8,400 - 31,200 - 1,640 =$ <p>- 24,440 rubles</p> <p>(line 3.1.1 column 3 + line 3.1.4 column 3 + line 3.1.5 column 3)</p>
3.4. Total Sum of Deductions to Material Incentive Fund	$420,000 - 22,150 =$ <p>397,850 rubles</p> <p>(line 2.6 column 4 + line 3.3 column 2)</p>	$633,000 - 24,440 =$ <p>608,560 rubles</p> <p>(line 2.6 column 7 + line 3.3 column 3)</p>

\* Data from Appendix 1.

Appendix 3. Example of calculating decrease in deductions to the material incentive fund in the case of violation of the schedule for launching a production capacity.

#### I. Initial Data:

- 1.1. Total volume of commodity construction production performed by the organization's own personnel according to the plan for the year - 51 million rubles.

1.2. Volume of commodity construction output performed by the organization's own personnel, for production capacity put into operation with a violation of scheduled launching time — 6 million rubles.

1.3. Organization's material incentive fund for the year according to plan — 871,160 rubles.

II. Determination of the Amount of the Material Incentive Fund Related to the Particular Production Capacity:

2.1. Proportion of volume of commodity production output for production capacity launched in operation within total volume of commodity construction output (line 1.2/line 1.1 x 100) — 11.76 percent.

2.2. Amount of material incentive fund related to production capacity launched with a violation of planned introduction time (line 2.1 x line 1.1/100) — 102,450 rubles.

III. The Amount of Reduction in Deductions to Material Incentive Fund — 10,250 Rubles.

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CSO: 1821/4

## CONSTRUCTION PLANNING AND ECONOMICS

### STATUTE ON CONSTRUCTION TRUSTS' MECHANIZATION TASKS

Moscow STOITEL'NAYA GAZETA in Russian 12 Sep 82 p 3

[Statute No 206 of the USSR Gosstroy on the Basic Tasks and Functions of Mechanization Trusts (Administrations) in Construction]

[Text] Statute No 206 was approved by the USSR Gosstroy on 16 August 1982, and it becomes effective as of 1 January 1983.

#### 1. General Provisions

1.1 Mechanization trusts (administrations) are specialized khozraschet subdivisions of construction organizations in which excavators, material-handling and road building machines, compressors, mobile power plants and other machines as well as mechanized tools and other small mechanized resources used in production operations at a construction site are concentrated.

Note: The order of administering a machine pool maintained on the balance of construction organizations specialized in relation to different types of jobs is determined by the appropriate ministry (department).

1.2. The main tasks of construction mechanization trusts (administrations) are:

mechanizing jobs with the purpose of insuring the commissioning of facilities under construction on schedule;

promoting growth in labor productivity and reduction of manual labor in construction by developing and raising the technical level of mechanized construction and installation jobs, and introducing the most effective production methods and new mechanization and automation resources;

raising the effectiveness with which the pool of construction machinery is utilized, and improving the methods of machinery technical maintenance and repair.

1.3. The main functions of construction mechanization trusts (administrations) are:

performing construction and installation jobs by mechanized methods, to include shared use of construction machinery with the general contractor (in the performance of installation, concrete laying and other jobs);

replenishing and improving the age and qualitative structure of the pool of machinery, equipment and mechanized tools, and improving administration of the machinery pool;

increasing the shift coefficient of machinery and improving its use within shifts;

maintaining machines in operable conditions by means of technical maintenance and repair of mechanized resources in accordance with the established system of planned preventive maintenance;

training and upgrading machine operators as well as workers involved in machinery technical maintenance and repair.

1.4. Mechanization trusts (administrations) are created by USSR ministries and departments and by the councils of ministers of the union republics in the established order.

1.5. The principal production subdivisions of mechanization trusts are mechanization administrations together with their operational bases, and small-scale mechanization administrations. (See "Basic Statutes on Tasks and Functions of Small-Scale Mechanization Administrations in Construction," approved by USSR Gosstroy Decree No 201 dated 5 August 1982).

1.6. Production subdivisions of mechanization administrations include mechanization sections and planned preventive maintenance sections operating on the basis of internal khozraschet, or foreman stations.

1.7. In accordance with the concrete conditions of machinery operation and the volumes of construction and installation jobs, mechanization administrations may be universal, or they may be specialized to perform individual types of jobs, or to run individual groups of machines in application to their function:

(tower cranes, jib cranes, small-scale mechanization resources etc.).

## 2. Production Activity of Construction Mechanization Trusts (Administrations)

2.1. The production activity of construction mechanization trusts (administrations) must be directed mainly at completing finished complexes of mechanized jobs at construction sites, to include:

completing complexes of jobs included in a complete production cycle and characterized by natural indicators (earth-moving operations, waterproofing, pile-driving etc.);

performing mechanized jobs jointly with construction and installation organizations (jobs performed jointly with construction and installation organizations



include those performed by a construction and installation organization jointly with a mechanization trust (administration) using resources belonging to the mechanization (administration) trust) at enterprises under construction and at complexes, stages and facilities under construction (to include expansion, reconstruction and reequipping of enterprises) characterized by a standard time of machine operation, as determined by the plan of production operations or by other documents coordinated upon by the parties and approved by a higher organization;

performing jobs at construction sites that cannot be related to particular complexes of mechanized jobs characterized by the time of machine operation (the list of such jobs is established by the ministries, departments or main administrations for construction of the executive committees of city soviets of peoples deputies (Glavmosstroy, Glavleningradstroy, Glavkiyevgorstroy etc.));

relocating machinery (installation, dismantling and transportation) and laying tracks beneath tower cranes and other auxiliary structures necessary for operation of the machinery at construction sites.

Moreover mechanization trusts (administrations) perform technical maintenance and repairs on construction machinery and provide material and technical support to the operation of construction equipment; they may perform other jobs away from the construction site--at outfitting bases, warehouses, quarries, construction industry enterprises and elsewhere, and they can make (given the availability of the production capacities) small mechanized resources, production gear, attachments and so on as ordered by construction and installation organizations.

2.2. Mechanization trusts (administrations) perform the following functions:

draw up production plans for mechanized jobs performed by their own manpower, and participate in examination of production plans for jobs requiring use of machinery belonging to them;

promote introduction of the most productive machinery in application to the particular volumes, processes and conditions of work;

maintain technical surveillance over the use of machinery, and instruct workers using mechanized tools.

(Conclusion follows in the next printing of this official notices column).

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CSO: 1821/7

SPEEDED-UP COMPLETED CONSTRUCTION URGED

Moscow EKONOMIKA STROITEL'STVA in Russian No 9, Sep 82 pp 45-48

[Article by I. G. Galkin, doctor of economic sciences, professor, Honored Scientist of the RSFSR, department head at MIU imeni S. Ordzhonikidze, and I. A. Titova, candidate of economic sciences and division head at NIIES of USSR Gosstroy: "Accelerate the Introduction of Capacities and Projects, Reduce the Level of Incomplete Construction"]

[Text] Speeding up the introduction of production capacities and projects and bringing the volume of incomplete construction down to the normative level remain one of the central problems in the 11th Five-Year Plan. The efficiency of capital investment in the national economy depends significantly on solving this problem.

"The new five-year plan," Comrade L. I. Brezhnev noted at the 26th CPSU Congress, "will be a major test for construction workers. A distinguishing feature of the new plan is all-out concentration of efforts on completing and launching as quickly as possible those enterprises which can insure maximum growth in output and open up tight spots."

Concentration of capital investment and labor and material resources at the most important start-up projects and limiting the number of new projects undertaken are essential steps to accelerate the return of capital investment and reduce the level of incomplete construction.

By the beginning of the 11th Five-Year Plan the volume of incomplete construction for the national economy as a whole and for particular sectors significantly exceeded the normative level. Thus, at the start of 1981 incomplete construction was 103 billion rubles or 80 percent of the annual volume of capital investment as compared to a norm of 67 percent.

Reducing above-norm incomplete construction and the corresponding increase in the launching of fixed capital would free 23 billion rubles for national economic circulation and insure significant growth in national income.

Analysis shows that all sectors of the national economy have substantial reserves for launching additional fixed capital and capacities in operation and reducing the level of incomplete construction to the established norms.

Above-norm incomplete construction, which has stayed at a high level for many years, not only inflicts direct damage on the national economy by lowering the efficiency of capital investment, but is also a major obstacle to normal organization of construction work. The practices of construction-installation organizations that put together unbalanced production programs and include large numbers of projects in plans without considering the available capacity of the construction-installation organizations and possibilities of providing the projects with material and financial resources in conformity with norms for length of construction hinder introduction of progressive flow methods of work and inevitably lead to failure to meet construction schedules and growth in the number of incomplete projects. The system of payment used earlier did not help speed up the introduction of projects.

Under such conditions it is difficult to carry out scientific organization of the production and labor of construction workers and insure normal work by all worker brigades on the basis of a stable production plan and operational work schedules.

The causes of above-norm volumes of incomplete construction have been thoroughly studied and this made it possible to determine the main ways to normalize the situation. The 12 July 1979 decree of the CPSU Central Committee and USSR Council of Ministers entitled "Improving Planning and Strengthening the Influence of the Economic Mechanism on Raising the Efficiency of Production Quality of Work" outlined a program of measures to "raise the efficiency of capital investment, accelerate the introduction of capacities and facilities at construction sites begun earlier and sharply reduce the number of newly begun projects in order to bring the volume of incomplete construction down to established norms."

The number of newly begun construction projects is being limited in conformity with steps to improve planning based on the development of capital investment plans reconciled with plans of existing production and balanced against the capacities of construction-organizations which insure absolute compliance with timetables for the established order of construction and launching of capacities and facilities.

But it is not enough to simply reduce the number of construction projects underway at one time. It is common knowledge that with a too-large overall volume of incomplete construction many construction organizations find themselves, at the beginning of the new planning period, without the necessary process stock ["zadel"] for full use of capacities and organizing rhythmic production.

The incomplete construction that has formed as the result of shortcomings in planning and failure to fulfill plans for construction-installation work and launching capacities and facilities is distributed very unevenly and spread over a large number of projects which have low levels of readiness. But normally organized production, where considerable time is required to make output when it is produced continuously or periodically, requires norm-controlled incomplete construction which forms the technological process stock. In this case, the longer the production cycle is the larger the necessary production stock must be.

Construction has a very long production cycle and requires the formation of appropriate process stocks whose total volume, with correct planning and observation of norms for length of construction, rhythmic production, and launching of capacities and facilities, is equal to the normal volume of incomplete production. The normal process stock planned and formed at sites with different degrees of readiness depending on planned launching times and normative length of construction not only creates a constantly renewed front of work, but is also a reliable guarantee of rhythmic construction work and timely, rhythmic introduction of production capacities and facilities into use.

At the November 1981 Plenum of the CPSU Central Committee Comrade L. I. Brezhnev, speaking of the tasks of construction workers in the 11th Five-Year Plan, especially noted the need to establish production stocks for normal work in the 12th Five-Year Plan, above all in the raw material sector.

The theory and methods of calculating process stock in construction which have been developed in the USSR are realized in practice by the system of process stock norms in construction for all sectors of the national economy. They are ratified by USSR Gosstroy and USSR Gosplan at the start of each five-year plan. The plan indicators of incomplete construction for ministries and departments are determined on the basis of these norms and monitoring of the actual amounts of it is done accordingly.

For the 11th Five-Year Plan USSR Gosstroy and USSR Gosplan ratified new process stock norms in construction. They were developed by NIIES [Scientific Research Institute of Construction Economics of the USSR Gosstroy] together with MIU [possibly Moscow Management Institute] imeni S. Ordzhonikidze. Process stock norms for construction of enterprises, buildings, and structures (Construction Norm No 440-79) were first published in the same document as the norms for length of construction. Sectorial process stock norms in construction were also ratified by sectors of the economy (Construction Norm No 411-81) and by "Process Stock Norms in Residential Construction with Due Regard for Integrated Building" (Construction Norm No 104-81).

The process stock norms are the main normative document for a scientifically substantiated determination of the level of incomplete construction when planning capital investment and evaluating plan fulfillment. They are used by planning bodies, ministries, and departments to plan capital investment and to monitor the level of incomplete construction and process stock in industry and residential-civil construction and limiting the number of construction sites and projects included in the plan.

These norms determine not only the overall level of incomplete construction that forms the normal process stock, but also the normative volume of capital investment and construction-installation work necessary to complete construction that has been begun. Furthermore, the norms establish process stock by capacity, which means the number of construction sites and projects which should be built at one time and also their readiness at the start of each planning period to insure planned launching of the capacities and facilities in compliance with norms for the length of construction.



thus, the process stock norms limit the number of construction sites and projects (that is, determine the degree of concentration of capital investment) and establish a normative overall volume of incomplete construction and its structure by readiness of construction sites and projects to insure prompt and planned launching of capacities and facilities.

The new process stock norms take into account new requirements that environmental protection measures be carried out. This required that enterprises include facilities to decontaminate waste water and do cultural-technical jobs; this led to a certain increase in length of construction and process stock in construction.

At the same time the norms take account of the 12 July 1979 decree of the CPSU Central Committee and USSR Council of Ministers on switching to accounts between clients and contractors for enterprises, start-up complexes, and facilities that are completely built, turned over for operation, and ready to produce output and render services. Therefore the norms reflected an appropriate decrease in the indicator of intermediate launching of fixed capital for certain enterprises. Start-up complexes were formed for the first time during development of norms for a number of enterprises. Both the one and the other are reflected in process stock indicators and change in the level of incomplete construction. It is important that the new norms have considered the amounts of process stock for the first year of construction of enterprises, start-up complexes, and facilities based on the requirements of construction technology and the need to carry on preparatory work before the main period of construction.

The length of construction and amount of process stock in construction were substantially influenced by the factor of increase in the unit capacity of the enterprises, start-up complexes, and aggregates whose construction is contemplated.

The process stock norms envision the possibility of beginning construction not only at the start of the year, but also in each quarter (month) of the year depending on the planned time of launching and the norm for length of construction. This also determines the corresponding amount of process stock at the end of the first year and of subsequent years. This is also important for enterprises and facilities on which construction is being begun in underdeveloped regions or in conditions where, for technological or organizational reasons, it is not possible to begin construction at the start of the calendar year. For example, the norm for length of construction of a spinning-thread factory is 30 months and 25 percent of the total volume of construction-installation work must be done in the first year of construction. If plans call for beginning construction of the factory in the second quarter the volume of construction-installation work for the first year should be 17 percent, so in the first case it is necessary to perform 82 percent of the total volume of construction-installation work in the first two years and in the second case 79 percent.

The new norms for length of construction and process stock in construction served as the basis for determining the calculated (normative) levels of process

stock in construction by sectors of the national economy, ministries, and departments relative to the plan for economic and social development of the USSR in 1981-1985. Itemized lists of construction projects, figures on the reproduction structure of capital investment and assignments for launching capacities and fixed capital, and lists of construction projects and facilities begun in the five-year plan for sectors of the nonproduction sphere (housing, municipal services, and the like) were used for this purpose. Data on the structure of construction by different types of facilities, their capacities, and their construction characteristics were very important as initial information.

In most sectors when the normative average sectorial length of construction changes the level of incomplete construction remains unchanged (chemical and food industry, construction, building materials and parts industry, housing construction). For certain sectors there may be an increase (power, ferrous metallurgy, power machine building, timber and wood processing industry) or a decrease (electrical equipment, chemical and petroleum machine building, and automotive industry) in the normative level of incomplete construction. The normative level of readiness of construction process stock in a large majority of the sectors increased at the same time.

Normative indicators of expenditures to complete construction begun during the 11th Five-Year Plan have been ratified (the ratio of the total remainder of the estimated ceiling on incomplete construction to annual volume of capital investment). Despite the fact that this was done for the first time it is possible to make a comparative analysis of all indicators for two five-year plans: the indicator of readiness of construction process stock was included in Construction Norm No 411-76, while NIIES determined the indicator of completion of construction begun as a calculated indicator for supplementary analysis of the condition of process stock in construction and checking the area of application of this indicator during planning and evaluation of the actual state of incomplete construction.

Normative levels of process stock in construction were ratified not only for capital investment but also for construction-installation work. This created conditions for a uniform approach to determining the amount of process stock for the client and the contractor. Specifically, this refers to the unequivocal determination of the front of future work at construction sites carried over to the beginning of the planning period which is necessary to complete already-begun construction within normative times. The level of readiness of construction process stock by sectors is also figured for capital investment and construction-installation work.

Thus, when working out the plan of capital investment and coordinating work volumes the client and contractor can plan and evaluate the amount of process stock in construction and volume of work subject to performance in the planning period with equal substantiation.

When putting together itemized lists of construction work within a project and compiling production programs for construction-installation organizations, project process stock norms for construction of enterprises, phases, and start-up complexes (Construction Norm No 440-79) are used. This makes it possible to

determine work volumes for process stock and carryover construction sites with good substantiation. The number of enterprises producing the same output that are under construction at one time and can be included in construction plans is limited on the basis of calculation using the process stock norm for capacity. The qualitative characteristic of process stock (its degree of readiness) is determined by the norm of readiness of construction process stock for capital investment (for the clients) and for construction-installation work (for the contractor). This makes it possible to determine the reliability and soundness of the plan for launching projects and also to establish the necessary front of work to insure rhythmic construction.

All this is aimed at achieving a situation where the principal participants in construction will have the same approach and orientation in solving such important problems of improving work in capital construction as reducing the number of enterprises and facilities under construction at one time, balancing work volume with the capacities of construction-installation organizations, and timely preparation of projects under construction for installation of production equipment and turning over enterprises, phases, start-up complexes, and facilities ready for operation at the normative times.

The client ministry can use the average weighted sectorial length of construction and indicator of expenditures to complete already-begun construction to determine the times of completion of carryover construction which require the capacities of construction-installation organizations and material-technical resources for timely completion and launching of these projects. New projects can be included in construction plans within limits established by process stock and construction time norms only after consideration of this work and work on technical re-equipping and reconstruction of existing enterprises if there is a reserve.

The new process stock norms ratified in housing construction take into account integrated building (Construction Norm No 104-81, first ratified in 1960) are very important. Many years of experience testify to successful application of process stock norms for the planning of housing construction by central, republic, and city planning bodies.

The use of these norms to plan housing construction in such major cities as Moscow, Leningrad, and Kiev made it possible to improve the activity of city construction-installation organizations, raise the level of working rhythm in them, and turn over residential buildings for use more evenly throughout the planning period.

Until recently, in most cases process stock norms in construction were used by planning agencies, ministries, and departments chiefly to plan and monitor the level of incomplete construction. But as the experience of leading contracting organizations shows, multifaceted use of the norms and methodology for planning process stock in putting together plans of capital investment and construction-installation work, compiling itemized lists of construction projects, and developing production programs for associations and trusts under conditions of continuous planning in industrial and civil-residential construction is becoming an important tool for planned management of the process of concentrating

resources, balancing the plan with the capacities of construction organizations, bolstering plan discipline, and raising the level of compliance with established timetables for launching facilities.

The direct necessity and efficiency of planned formation of strictly oriented process stocks in construction based on norms is particularly great with the transition taking place generally to charging and paying for enterprises, start-up complexes, and facilities that are fully completed and ready for operation.

The system of bank credit for the expenditures of contracting organizations related to incomplete production demands the existence of rigidly controlled technological process stock and absolute compliance with planned times for turning over construction projects to the client and launching them.

Implementation of the program of measures to improve the economic mechanism of management, above all planning, creates favorable conditions for successfully meeting the challenges of concentrating resources and reducing the volume of incomplete construction to normative process stocks, which insures rhythmic production and timely launching of production capacities and facilities.

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## INDUSTRIAL CONSTRUCTION

### INDUSTRIAL ARCHITECTURE IN MOSCOW: PRINCIPLES AND PROGRESS

Moscow STROITEL'STVO I ARKHITEKTURA MOSKVY in Russian No 4, Apr 82 (signed to press 2 Apr 82 pp 14-17)

[Article by Doctor of Architecture N. Kim, board secretary of the USSR Union of Architects: "Industrial Enterprise Architecture"]

[Text] Questions of improving the quality of production facility architecture are an inseparable, integral part of the continuing transformation of the capital. This results, on the one hand, from the high volume of construction work being done in this area and, on the other, from the social and city-development importance of this work.

The term "industrial architecture" includes the concept of the entire material and aesthetic environment in the field of industrial production. This concept means the intelligent siting of industrial enterprises in the city, architectural-layout organization, building up industrial enterprises and centers (complexes), the typology of industrial buildings and structures, the organization of cultural and personal services to workers at industrial enterprises and complexes. It also includes the architectural-aesthetic organization of the production environment, the provision of plant sites with public amenities, the expressiveness of the outside of structures and the interiors of production and auxiliary premises, steps to improve working conditions, and so on.

It is known that the development of our industrial architecture has been linked most closely with the scientific-technical revolution, which is creating an objective necessity for means of automating production processes. And it is both basic and auxiliary operations which are being performed by automated processes.

One clear example of the influence of technical progress on architecture is the new ZIL 70,000 m<sup>2</sup> assembly plant. A computer-controlled conveyor follows a prescribed program in assembling all ZIL-family vehicles on two parallel lines. The primary conveyor machinery, automatic pneumatic installations and step-type selectors are located in the basement. The machine shop is run by automatic machines; people do not have access to it. The assembly plant is equipped with a system of automated push-type trolley conveyors. About 20 kilometers of steel track on which hundreds of subassemblies and parts flow from warehouses and other shops following a prescribed program which takes into account the model and style of the vehicles being assembled, and even the colors of each vehicle, has been laid under the floor.

This facility is an indicator of the close interconnection between the very complex and far-flung technological supply lines and the modular-layout resolution of the building, which essentially has technical floors above and below, between the girders and in the basement.

As the achievements of the scientific-technical revolution are introduced into production, man is gradually being freed from direct participation in the technological process and is being transformed into a "creator and master" of entire comprehensively automated systems. In this connection, the importance of workers employed in servicing equipment is increasing: repairmen, servicemen, tool makers. These new categories of workers are highly skilled, with broad occupational and general-educational skills.

Together with increased research and a gradual shift in the center of gravity of human labor into the preparatory phases of production, the demand for engineering-technical workers is also growing, and in particular, the demand for technicians, designers, technologists, mathematicians to develop programs, and so forth.

The demand for scientific labor organization is also growing, with important significance being given to the architectural organization of the entire production environment.

According to the General Plan for the development of Moscow, a number of large production and warehouse facilities, scientific research institutes and prototype enterprises will be built. Moreover, a large amount of work faces us in connection with the renovation and transformation of industrial zones and enterprises with dilapidated, obsolete and obsolescent capital assets.

Several years ago, a large complex of architecturally interesting "Khromatron" production facilities (architect Ye. Barkalov, MIESPI [not further identified]) arose on the outskirts of the capital on the beltline highway. This important city-development transport center is at the same time a junction in the activity of three large architecture collectives: two rayon shops led by Honored Architects of the RSFSR Z. Rozinfel'd and V. Nesterov. Housing for approximately 70,000 people and a number of public buildings and personal-services facilities are being built in this area immediately adjacent to the production facilities. We are thus implementing the progressive concept of merging nonhazardous production facilities with housing developments and are actualizing one of the essential provisions of the General Plan, that on creating production and land-development regions and zones ensuring pedestrian access for the bulk of the workers and minimum expenditures of time on travel from housing to the workplace.

We are pleased to note that the successful layout and modular-spatial resolution of the "Khromatron" production complex at this transport-artery junction has transformed it into one of the most beautiful drives in Moscow.

A considerable portion of Varshavskoye [Warsaw] Highway is currently being intensively built up with new production projects (area chief architect V. Voskresenskiy).

Development of the layout and build-up of production facilities on Profsoyuznaya Ulitsa, a continuation of Kaluzhskoye Shosse (region chief architect Ya. Belopol'skiy), and of Dmitrovskoye Shosse (region chief architect, People's Architect of the USSR I. Loveyko) is largely complete.

One can already encounter attractively designed production buildings on these important capital transportation arteries. The architecture of a number of them inscribes itself well on the scope and rhythm of capital development, testifying to the rising level of occupational skill among architects of industrial planning institutes and to their increasing opportunities. One should especially note the valuable creative participation of region chief architects in the architectural organization of the indicated industrial zones.

Positive results have been achieved in the current comprehensive development of the production zone in the Rubtsovskaya Naberezhnaya region (promstroyproyekt, Goskhimproyekt, Giprostanok, GPI-6) and the Khimki-Khovrino municipal-services zone in the Smol'naya Ulitsa region (GPI-t, Giprotorg, "Mosproyekt-1" and "Mosproyekt-2").

The press has had high praise for the architecture of the AZLK [not further identified] (architect K. Tokarenko, Promstroyproyekt), "Stankoagregat" plant (architects G. Agranovich and V. Yelina, Giprostanok) and a number of others. These and several other production projects have enriched the architectural appearance of a number of capital streets and highways.

The Moscow General Plan NIiPI /Scientific Research and Planning Institute/ has done considerable work on drawing up production-zone layout plans for the city. A majority of the production zones have now been provided with layout plans.

One senses that the GlavAPU [Main Architectural Planning Administration of the City of Moscow] has in recent years begun paying more attention to the architecture of the capital's production projects. The architectural appearance of many enterprises has been improved and travel time to work has been reduced somewhat. About 70 percent of the people in the southwestern part of the city now work in their own [housing] region, for example.

However, there are still many unresolved tasks and difficulties in laying out and building up production zones. Important industrial architecture questions important to city development are still being resolved incomprehensively, piecemeal. Current Moscow capital investment distribution practice is often narrowly departmental in nature, complicating and practically excluding the possibility of interbranch consolidation of funds for construction in a single zone, with optimum expenditures of funds on common facilities. This is why even such zones as Varshavskoye Shosse and Profsoyuznaya Ulitsa have not been built up with a single intent, as an integral ensemble. This also leads to significant increases in construction costs. Strange as it may seem, the advantages of our socialist, planned economy are still not being used adequately to coordinate and plan industrial construction in the capital.

It is known that the future standard of living of the populace in the capital will depend largely on proper organization of the labor sphere and implementation of the main provisions of the general plan. At the same time, a departmental approach to industrial construction delays transforming architecture in the

city's industrial regions. For example, let us point out that heretofore, practically nothing has been done to carry out the decree on removing a number of hygienically hazardous enterprises outside the Moscow city limits. Of 320 enterprises cited, only several small facilities have been removed as of today. And this, in turn, has a negative effect on air quality and the architectural appearance of a number of capital regions.

One feels in Moscow that it is urgently necessary to save as much city land as possible. However, many facilities such as warehouses, service stations, and so forth, are still being built in single stories, with low build-up density. Industry uses its sites and adjacent land parcels inefficiently in many instances. Multistory and higher-story buildings are being introduced into industrial construction slowly, a consequence of the fact that the "diktat" of the technologist holds sway on many fundamental questions of industrial architecture, including that of selecting optimum types of industrial buildings and their modularization. There is little involved joint development here with the equal participation of architects.

Life proves that the most fruitful results in comprehensively resolving industrial enterprises are obtained precisely when both technically and creatively well-trained architects are the true organizers of space and the whole production environment.

However, the architectural-artistic level of the industrial enterprises being built in Moscow is still low in many instances. Both the level of provision of plant sites with public amenities and the shop interiors lag behind modern requirements.

The production interior should be viewed as part of the overall problem of improving working conditions, which also includes such questions as the struggle against production noise, eliminating production hazards in the form of gases, dust and excess heat, creating an optimum level of workplace illumination, efficient color organization, and so forth.

Questions concerning production interiors should be examined in close connection with the outside appearance of the production building, with the surrounding site and providing it with public amenities and landscaping. Development of the interior also includes efficient shop and workplace space organization and a well thought-out arrangement of machine tools. The production interior should thus be resolved comprehensively, on a scientific basis, by thoroughly studying all factors influencing the overall condition of people, how they feel, factors reducing fatigue and accidents and increasing labor productivity.

Speaking about the interior, we must not fail to note the integral link between the design and architecture of a premises. Unfortunately, many industrial designs are still aesthetically imperfect. Architects must work together with designers on the form of industrial design elements from the very start of the planning, examining not only their technological efficiency and durability, but also their aesthetic indicators.

Improving personal-services premises for workers at industrial enterprises is an important section of industrial architecture, one encompassing medical, public health and public-cultural services, public catering, recreation and education.



In examining the social problems of industrial architecture, we need to note the leading experience in creating the public sports complex of the Motor Vehicle Plant imeni Lenin Komsomol in Moscow. Located next to the plant's production and expansion zones, it includes a central sports nucleus in the form of a stadium with grandstands for 10,000 people, three soccer fields, six basketball and volleyball courts, four tennis courts and two hockey fields, a multipurpose Sports Palace with a swimming pool, sports halls and track and field facility, an enclosed rink with artificial ice and stands for 1,000 people, a Palace of Culture with a hall seating 1,200 people, 20 study-group premises and a movie theater and lecture hall seating 300 people.

Characteristically, the plant workers themselves and workers from neighboring enterprises took an active part in the construction of this large public sports complex.

The complex has been operating successfully for a number of years now. Its social importance is great: whereas about 20 percent of the plant workers previously were involved actively in sports, that figure is now 46 percent. The number of sports sections has increased from 17 to 29. Cultural-educational work has increased appreciably at the plant: there are 18 people's universities with 8,000 students and 12 clubs (with 3,000 members). The number of self-guided artist collectives has increased three-fold and the number of participants in them has increased five-fold.

The most important achievement of this public sports complex in this capital enterprise has been the fuller and more comprehensive satisfaction of the cultural needs of the labor collective and the inculcation of a sense of patriotism towards its enterprise.

Opportunities for achieving expressive architectural-spatial resolutions in industrial enterprises by contrasting basic production buildings with cultural and personal-services buildings, administration buildings and engineering-laboratory service buildings are diverse.

Speaking of pressing problems of industrial architecture, we must not fail to mention the achievements and experience of a number of planning institutes (Promstroyproyekt, GPI-6 and many others), as well as the scientifically substantiated recommendations and developments of the TsNIIpromzdaniy /Central Scientific Research Institute of Industrial Buildings/. The reference is to the principles of shaping industrial centers, combining center-wide engineering facilities and improving the effectiveness of site use. Economical types of industrial buildings have been studied, including multistory ones with large column grids and greater width. Steps have been outlined for improving the architectural appearance of enterprises, production interiors, and cultural and personal services to workers at industrial enterprises. Buildings made of lightweight components and effective materials have also been developed.

These scientific developments are being introduced very effectively in many republics and cities of our country. But they are little used in Moscow. The reason is that, until recently, there has been no lead organization for architectural planning for industrial enterprises for the city.

Heretofore, about 150 planning organizations of ministries and departments, including ones located outside Moscow, have been engaged in the construction planning of capital production projects. The low level of the architectural-construction portion of plans worked out by these organizations has been criticized at scientific-technical conferences held by the Moscow gorkom and the Moscow gorispolkom. Since that time, no radical changes have occurred in the organization of architectural-construction planning for industrial projects. As a result, real opportunities for improving capital investment effectiveness and the quality of production project architecture have been lost in many instances.

A special Mospromproyekt institute has now been created. We all await much effective action from it.

We need to engage the large planning institutes specialized for industry which are located in the capital in resolving the tasks of improving the quality of architectural-construction plans for industrial projects. It seems appropriate to attach one such institute, the Promstroyproyekt, Giprostanok and others, to each regional shop in order for these collectives to constantly render region architects practical assistance on questions of industrial enterprise site layout and development. This must be an honored duty of the institutes, although the nature and financing of their participation must also be legalized. The TsNIIpromzdaniy is already participating in such work. The GlavAPU must head up this work.

It should be especially stressed that the means and methods of attaining aesthetic improvement and uniqueness in industrial buildings, enterprises and complexes, and they include tectonics, contrast, metric series, architectural scale, plastic, silhouette, and so forth, are available to a much greater extent in the arsenal of an industrial organization architect than to housing and civil-construction architects.

However, in spite of all the achievements of Soviet industrial architecture, it is precisely the architectural-artistic resolutions of industrial enterprises which lag behind the growing demands of our society.

This situation is to be explained by the inadequate attention being paid to compositional resolutions when planning industrial buildings, to the architectural-artistic aspect of the production environment, to the social essence of industrial architecture.

We need to use industrial methods of construction predominately, but not to the exclusion of compositional searches and achieving expressive architectural resolutions in industrial buildings and complexes. In this regard, we can and must use in Moscow such layout and compositional resolutions when industrial buildings are included in city development (preferably by grouping them into special industrial zones). This flows from the principles of our city building and development concept -- an efficient proximity of work, living and cultural zones, saving city land and worker free time; this does not contradict public-health requirements as to sanitation zones separating industrial enterprises and development regions.

The fact is that approximately 40 percent of all industrial enterprises are in class IV and V under the production facility sanitation classification, and these classes are actually city build-up projects such as footwear, garment, knitwear and confectionery factories, tool-making plants, watch plants, machine-building plants, printing and publishing houses, dairies, packing plants, bakeries, public-services enterprises, machine shops and city transport enterprises. The buildings for such enterprises are ordinarily multistory; they are larger in dimension, articulation and scale than ordinary civil-engineering buildings, and they are sometimes advantageously distinguished in modular-layout structure and structural parameters (story height, column grid). Such buildings, which have in a number of instances become the dominant architectural features in city development, can be seen in many cities of our country. They inject diversity into the architectural organization of streets, squares and transport arteries.

The inclusion of industrial enterprises in the composition of city development is associated with the resolution of complex problems. Let us analyze some of them using Moscow practice as an example.

Over the past decade, industrial zones have been built in Moscow in Medvedkovo, on Profsoyuznaya Ulitsa and on Varshavskoye and Shchelkovskoye shosses [highways]. The industrial zones have been built up using large new physical plants for industrial enterprises of various branches. Many technical innovations have also been used here. The buildings were put up using modern industrial components. Many of them are well-crafted, using a variety of compositional methods and new construction and finishing materials. However, there is in many cases an absence of architectural completeness, of ensemble finish as a whole; many buildings are variegated, lacking unity.

An analysis of the practical planning and development of city industrial complexes and enterprises testifies to the fact that in an overwhelming majority of cases, imperfection in the artistic resolutions of industrial enterprises is expressed in insufficient attention to city development questions, and especially to questions of architectural-compositional perfection and the expressiveness of industrial development in cities.

It is precisely from positions of completeness that one must view the problem of the construction and architecture of industrial enterprises.

Considerable work faces us in renovating capital enterprises. According to the renovation and expansion plan, we will be planning the installation of new production and warehouse structures in the very near future for "Trekhgornaya manufaktura," Moscow Carburetor Plant, the Thin-Cloth Factory imeni P. Alekseyev and the rye bread bakery.

Such renovation steps must be taken without shutting down existing shops. In view of the increasing crowding of sites and the demand for increased production sites, the TsNIIpromzdaniy is preparing recommendations on the construction of new buildings at existing enterprises by raising stories, a method developed and mastered in Armenia.

Providing sites with public amenities and using elements of monumental-decorative art are of important significance in shaping the architectural-artistic

appearance of industrial enterprises. Workers proudly call many of our enterprises "garden-plants." The automotive plant imeni Likhachev and the "Stankolit," for example.

Methods of landscaping plant sites are diverse. They include protection from production hazards, wind and snowdrift protection and protection from excess solar radiation. By skillfully using vegetation to resolve functional-technical tasks, architects simultaneously resolve the architectural-artistic tasks of the entire industrial complex. Plant and factory sites well-provided with public amenities bespeak high artistic standards and concern for people and they inspire love for the enterprise.

As the nature of the labor process changes at industrial enterprises and as a communist attitude towards labor develops, the words of the CPSU Program to the effect that artistic principles increasingly inspire labor, beautify everyday life and ennoble man sound ever more convincing. This also determines the tasks of Soviet industrial architecture.

Through common effort, we can and must achieve fundamental improvement in the architecture of production projects of Moscow in order to accelerate resolution of the comprehensive task of transforming the capital into a model communist city.

[captions to photos not reproduced for this report]

- 1, 2. Engineering-laboratory facilities (mock-ups). Variants
3. Scientific research institute plan (mock-up). Variant
4. Machine-Tool Building Plant imeni Sergo Ordzhonikidze
5. "Trekhgornaya manufaktura" Cotton Combine imeni F. E. Dzerzhinskiy
6. AZLK museum
7. "Kalibr" tool plant
8. "Frezer" cutting-tool plant
9. Mosgorispolkom Special Plant No 1
10. "Khromatron" plant
11. Moscow Watch Plant No 2

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## INDUSTRIAL CONSTRUCTION

### CONSTRUCTION IN UKRAINIAN SSR SURVEYED

Kiev STROITEL'STVO I ARKHITEKTURA in Russian No 8, Aug 82 (signed to press 28 Jul 82)  
pp 1-2

[Unsigned article: "Construction on the Path of Intensification"]

[Text] Builders, workers of the construction and building materials industry and designers in Soviet Ukraine are celebrating their occupational holiday in an atmosphere of vigorous work and political activity. The decisions of the 26th CPSU Congress and the 26th congress of the Ukrainian CP as well as the directives and recommendations of the General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet, comrade L. I. Brezhnev are being successfully translated into reality. Steps are being taken to further improve capital construction and convert to the path of intensification of the construction process. Every condition has been provided in this republic to build more rapidly and better, at minimum cost and on an up-to-date technological basis.

In 1981 the volume of capital investments in the republic's economy was about 19 billion rubles. More than 190 construction projects of major importance to the national economy have been put into operation. Capacities have been activated for the extraction of 3.5 million tons of raw iron ore at the Southern and Central mining and concentrating combines, the extraction of 3 million tons of coal at the "Golzhanskaya-Kapital'naya" Mine with an integral concentrator factory processing 6 million tons of coal annually, for the generation of 700,000 kw of electrical power at the Dnestr GES /Hydroelectric Power Station/, which represents the first element of a major hydroelectric power project, and many others.

A large volume of housing, communal, cultural and consumer-services construction is being carried out. Last year 17.8 million sq m of dwelling area, many schools, hospitals, and other socio-cultural buildings have been released for occupancy.

In many cities of the republic, single-customer services have been set up and steps are being taken to organize continuous-flow construction on the basis of 2-year continuous planning of residential and communal buildings.

A huge house-building potential consisting of 72 large-panel and modular house-building enterprises with an aggregate capacity of about 8 million sq m of dwelling area annually has been established.

In industrial construction, the unitized method of the design and organization of the construction of large industrial complexes, approved by the Ukrainian CP Central Committee, is being introduced. Currently, this method is followed in building the major development projects of the 11th Five-Year Plan: the oxygen converter shop at the Dneprodzerzhinsk Metallurgical Plant, the "3000" rolling mill in Zhdanov, the coke-oven battery in Zaporozh'ye, and others.

Progressive structural elements, new effective materials and products and advanced production technologies are being introduced on a large scale in the construction of industrial facilities. Thus, the construction of the "3000" rolling mill at the Zhdanov Metallurgical Plant has involved the use of more than 2,000 sq m of all-purpose hollow blocks, 12,000 sq m of industrial partitions, more than 2,000 sq m of 12-m long wall panels fabricated from lightweight concretes, the concreting of 136,000 cu m of structural elements with the aid of progressive types of molds, etc.

Progressive designs of pile foundations, mastic roofing materials and waterproof insulating materials are being widely introduced, and the construction of underground structures by the "wall in soil" method is being expanded.

The enterprises of the construction ministries and departments fabricated and shipped to construction sites in 1981 more than 9,500 units of means of mechanization and equipment. About 1,000 specialized brigades have been provided with complete sets of technological equipment.

The brigade system has become widespread in construction; this year nearly 13,000 brigades are working on the basis of this combined-skills system at the republic's construction sites. The volume of the introduction of large-block installation of technological equipment, annual brigade plans, brigade planning and equipment systems, and other measures to improve the management, planning and organization of the construction process is rising.

The construction sector employs more than 90 Heroes of Socialist Labor; 390 persons have been awarded the honorific of Honored Builder of the UkSSR. During the 10th Five-Year Plan period alone the honorific of Hero of Socialist Labor has been granted to 12 outstanding workers.

Twelve production pacesetters were awarded the honorific of Winner of the USSR State Prize and 14, the honorific of Winner of the UkSSR State Prize. In 1981 the following were awarded the honorific of winner of the USSR State Prize: Yuriy Filippovich Chernov, fitter-toolmaker at the Voroshilovgrad Enameling Plant imeni Artem; Vasiliy Fedorovich Podtykan, leader of the installers' brigade at the Zhdanov Metal Structural Components Plant; and Aleksandr Vasil'yevich Fedan, leader of electrowelders' brigade at the Yasinovataya Reinforced Concrete Products Plant. In addition, six other workers-builders were awarded the honorific of Winner of the UkSSR State Prize in that year.

Currently it is an important national-economic task to increase the effectiveness of capital construction through an expanded application of the achievements of scientific and technological progress, new equipment and advanced knowhow.

In construction, each year witnesses growth in the volume of technically complex tasks requiring clear organizational and technical solutions and well-coordinated management, preparations, organization and technology of the construction process. The share of large-panel housing construction based on new improved series of building designs is rising.

The republic's scientific research organizations have proposed a large number of R&D projects for practical introduction. These projects were developed in close cooperation with design-organization associates and production personnel.

Automated construction control systems have been developed and are being introduced. They assure an increased utilization of productive capacities, reduction of work-time losses and shortening of the construction cycle.

In the republic six comprehensive scientific-technical programs have been drafted and are being implemented. They encompass the principal directions of scientific and technical progress in the branch--continuous-flow industrial and housing-communal construction; regular and comprehensive mechanization with allowance for the formation and use of the pool of construction machinery and equipment; effective technologies for the production of precast reinforced concrete; and a comprehensive quality control system.

The efforts of the collectives of all the construction subcontractor organizations are focused on the maximum utilization of available resources and increase in labor productivity.

Unfortunately, however, there still occur fairly frequent instances of prolonged stoppages of machinery and equipment; the utilization of their time is not improving. The quantity of the means of small-scale mechanization in recent years has grown by a factor of about 1.5, but the proportion of manual labor is not declining. Although the UkSSR Mintyazhstroy [Ministry of Heavy and Transport Machine Building], Minpromstroy [Ministry of Industrial Construction] and Minsel'stroy [Ministry of Agricultural Construction] operate with high-capacity equipment in quantities adequate for a mechanized implementation of the entire volume of finishing operations, in practice not more than 30 percent of that volume is handled with the aid of such equipment. High-capacity equipment for concreting operations is not being utilized satisfactorily. The volume of the use of high-strength concrete structural components at the Minpromstroy and Mintyazhstroy of the republic accounts for only 3 percent of the total volume of precast reinforced concrete.

Despite the effectiveness of and considerable experience in the introduction of the hydraulic blasting method of compacting soils of the sagging kind, this method has not found mass application.

The schedules for completing experimental facilities are not being followed.

The subsector ministries and departments of the republic still have not set up a reliable system for the planning and organization of the introduction of new technology: the plans for such introduction are poorly coordinated with the construction plans and the supply of material and manpower resources, and the recommendations of the scientific research organizations are not being utilized on an adequate scale.

A major role in implementing the extensive program for capital construction belongs to the scientific-research, design and design-technological organizations; their performance largely affects the development and technological updating of the branch. Currently in the republic about 350 scientific research and design organizations employing more than 150,000 persons work for capital construction. Each year more than 30 million rubles of R&D work is carried out and more than 18 billion [as published] rubles of design documents and blueprints is issued.

The volume of the work on the automation of designing and blueprints has markedly increased. In the Ukraine 32 computers are used for this purpose; computer centers have been established at the institutes Giprograzhdanpromstroy [State Institute for the Design and Planning of Urban and Industrial Construction], Giprograd [State Institute for the Planning of Cities], Krymniiprojekt [Crimean Scientific Research Institute of Design and Planning], Khar'kovproyekt, etc.; and all the basic engineering and technical calculations and the preparation of cost estimates have been automated. By the end of the 11th Five-Year Plan period the automation of design work should reach 15-20 percent. This is a difficult but feasible task, as evidenced by the positive experience of the Giprokhimmash [State Institute for the Planning of Chemical Machinery Plants], the KievZNIIEP [Kiev Zonal Scientific Research and Planning Institute for Standard and Experimental Planning of Residential and Public Buildings] and the Giprograzhdanpromstroy, at which the level of automation is already close to that planned.

In the field of housing construction our achievements are indisputable. In no other country in the world is it conducted on such a large scale. The principal type of housing construction in the republic has become large-panel house building, which in 1981 accounted for 61.2 percent of all the dwelling area released for occupancy. In this connection, 64.7 percent of all residential buildings was erected according to standard designs of new series, which was 7.9 percent more than in 1980.

Further improvements in modular-block housing construction are under way and panel-block construction is being organized.

In recent years major urban-planning measures have been taken in various cities of the republic to complete the formation of central squares and other important centers. Many of the solutions reflect the increased expertise of urban planners and architects.

Analysis of the build-up of residential rayons and housing projects points on the whole to its qualitative improvement. The best of these are the Yuzhnyy and Sriblyastnyy rayons in Lvov, the Severnyy Tavricheskiy Rayon in Kherson, the Vinogradar' in Kiev, the Pobeda and Sokol in Dnepropetrovsk and others.

Recently new series of residential buildings began to be designed more broadly on the basis of the so-called addressed method, on utilizing the available house-building facilities, in this republic. This refers to series 134 for Kiev, Krivoy Rog and Donetsk, series 94 for Chernigov, and series T for Kiev. Series T, developed with allowance for the existing technological facilities, which produces savings of several million rubles, deserves special mention.

Owing to the use of the new design methods, the urban build-up potential of these series is being expanded while at the same time stabilizing the variety of structural components fabricated at the house-building combines.

Positive examples of the building of new cities are provided by Novoyarovovsk in Lvov Oblast and Pripyat' in Kiev Oblast, where urban-planning concepts and interesting architectural and layout solutions of civic centers, residential areas, places of recreation and transport connections and pedestrian crossings are being implemented.



On the whole, however, the architectural-artistic qualities of mass build-up in this republic still lag behind present-day needs. The problem of improving the quality and variety of build-up remains acute and unsolved. In some cities housing is built on the basis of obsolete design series.

Much work is being done to improve and develop housing construction in the countryside of this republic. Eighty seven standard house designs have been developed for private home builders with allowance for local natural and climate conditions of the republic and the possibilities for using local materials and industrialized components in the construction. These designs will be used to build at least 1 million sq m of dwelling area to the order of the kolkhozes, sovkhoses and the local population by the end of the 11th Five-Year Plan. Currently, production facilities for rural large-panel and modular-block construction are being established. Nine rural construction combines and rural house-building combines have already been built and started to operate. Villages in the republic are being renovated on an expanding scale. Thus while in the 1960s only 20 or 30 villages subjected to comprehensive renovation could have been named, at present already some 400 Ukrainian villages are not inferior to urban housing projects in quality of build-up and amenities.

A characteristic feature of the redesigning of villages at present is that it has transcended the boundaries of distinct settlements and encompasses the territories of entire administrative rayons.

The collectives of construction organizations and enterprises of the construction industry display considerable labor enthusiasm in striving to attain the highest and most stable indicators in the all-Union socialist competition. On the basis of the results achieved in 1981, 18 collectives have been awarded the challenge red banners of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Trade-Union Council and the Komsomol Central Committee, including 10 whose names have been inscribed on the All-Union Honor List at the VDNKh [Exposition of Achievements of the National Economy].

Socialist competition for the preterm completion of plans for the first 2 years of the five-year plan in honor of the 60th anniversary of the USSR is now sweeping the republic.

Of special importance is the organization of socialist competition on the "worker relay race" principle. Its results are graphically demonstrated by the construction of light-industry facilities. In 1981 all the planned facilities were put into operation ahead of schedule. Builders, installers and operators were highly commended for this work in the welcoming message of Leonid Il'ich Brezhnev.

The competition on the "worker relay race" principle has this year been organized at a high level in building the "3000" plate rolling mill in Zhdanov, the oxygen converter shop at the Dneprovskiy Metallurgical Combine in Dneprodzerzhinsk and Khartsyzsk pipe plants, and the construction of the coke-oven battery in Zaporozh'ye.

A widespread effect is being produced by the initiative of the leading installation brigades at house-building combines--the brigades of Hero of Socialist Labor Ivan Dmitriyevich Ganchev from the Nikopol' Construction Trust, Vladimir Sergeyevich Plakhotin from Khar'kov, Grigoriy Ivanovich Donets from Kiev, and other pacesetters who initiated the pledge to achieve an output of at least 100,000 rubles annually per installer during the 11th Five-Year Plan period. This initiative was approved by the

Ukrainian CP Central Committee and recommended for widespread introduction. In 1981 the collectives of 18 brigades had reached that goal. They include the brigades of I. A. Kleshchevnikov from the Donetsk DSK-1 /House-Building Combine No 1/; V. S. Plakhotin, A. N. Chub and V. Ye. Kazarinov from the Khar'kov DSK-1; I. N. Cherezov from the Kherson DSK; and T. S. Ishchuk from the Kiev DSK-1, and others.

A widespread effect is also being produced by the initiative for the creative collaboration of construction brigades and designers in the republic under the slogan "High Quality from Design to Construction Stages." Currently 252 construction brigades and 168 creative design teams are participating in this competition.

The tasks of the second year of the 11th Five-Year Plan are being accomplished through an increase in labor productivity without an increase in the numbers of workers.

Plans exist to carry out a complex whole of measures to solve the problem of a radical improvement in the quality of prefabricated components and a sharp reduction in the labor-intensiveness of the erection of large-panel residential buildings, as well as to broadly develop the brigade form of the organization and stimulation of labor at enterprises of the construction industry and in motor transport.

It is necessary to increase the use of lightweight structural components made from effective materials, lightweight metal structural components and prefabricated wall partitions.

Tasks have been specified for the construction, modernization and expansion of construction-industry enterprises with the object of further expanding the output of effective structural elements, materials and products and enhancing their offsite readiness and quality. The efforts of the branch's workers should be focused on an unconditional fulfillment of the tasks of updating enterprise equipment at a faster rate, broad introduction of means of automation and mechanization and a sharp reduction in the share of manual labor.

Special attention should be paid to developing and introducing energy- and resource-saving technologies, increasing the utilization of the wastes and by-products of other industrial subsectors in the production of building materials and products.

Celebrating the Day of the Builder, the workers of construction sites, construction-industry enterprises and project-design and scientific research organizations of the branch are resolutely determined to implement the tasks posed in the field of capital construction by the 26th CPSU Congress and the 26th congress of the Ukrainian CP, and to carry out the directive of comrade L. I. Brezhnev, General Secretary of the CPSU Central Committee, to "Accomplish effective and radical changes in capital construction, put into operation production capacities at all projects without exception as provided by the plan."

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## INDUSTRIAL CONSTRUCTION

### GOALS OF FERROUS METALLURGY CONSTRUCTION FOR 1982 OUTLINED

Moscow STROITEL'NAYA GAZETA in Russian 2 Jun 82 p 2

[Article: "By a Billion Rubles"]

[Text] In carrying out the decrees of the 26th CPSU Congress and the November (1981) Plenum of the CPSU Central Committee for the further development of ferrous metallurgy, the builders of this branch's enterprises must put to use 3.7 billion rubles' worth of capital investments in 1982 and perform 1.8 billion rubles' worth of construction and installation work, which is 12 percent more than was done in 1981. Because of the construction of new and the expansion and modernization of existing enterprises, an increase in production capacities for the extraction of iron ore in the amount of 17.1 million tons has been stipulated, along with increased production of steel (by 2.3 million tons), rolled steel stock (950,000 tons) and steel pipe (519,100 tons).

The party's plan for improving the effectiveness of capital investments in every way possible is coming to life. The significant increase in the introduction of fixed capital, but with a smaller increase in total allocations, should be considered a matter of fundamental importance in this year's construction plan. The planned introduction of 5 billion rubles of fixed capital in ferrous metallurgy exceeds the amount of capital investments by more than 1 billion rubles, which is an important step toward reducing incomplete construction. Expenditures for modernization and technical re-equipping are being increased; they constitute about 40 percent of the total.

The start-up program for the year specifies the introduction into operation of 123 large industrial projects and complexes, including 36 of primary state importance. Among the most important projects under construction are the tin shop at the Karaganda metallurgical combine, the converter shop at the Dneprovskiy metallurgical plant imeni Dzerzhinskiy, the cold-rolling shops at the Magnitogorsk metallurgical combine and the Novolipetsk metallurgical plant and powerful new facilities at the Nizhnetagil'sk metallurgical combine, the Vyksa metallurgical and Volzhskiy pipe plants, the "Serp i molot" plant and the Kostomuksha, Stoylenskiy, Lebedin and Mikhaylovskiy GOK's [mining and concentration combine]. Coke furnace batteries are being introduced in the Altay and in Zaporozh'ye.

The builders, installers, miners and metallurgical workers of Belgorod Oblast displayed some valuable initiative at the beginning of the year. They took upon themselves the obligation to produce steel ahead of schedule at the Oskol'skiy

electrometallurgical combine and to finish projects involving its raw material base at the Lebedin GOK. The commitments of the initiators of the competition are extremely characteristic of them. They took them on not for 1 year, as is normal, but for two, 1982 and 1983; that is, for the entire period needed to solve the main problem, which is the introduction ahead of schedule, in 1983, of the start-up complex of the crown jewel of furnaceless metallurgy in this country. This initiative requires constant attention and assistance from the enterprises, ministries and departments that are either directly or indirectly involved with this construction project.

The example of the competition's initiators found complete support in the construction collectives. During the most recent part of the year, 2 percent more capital investments were put to use in ferrous metallurgy than for the same period last year, with the figure being even higher for projects already under construction. Planned capacities for the production of iron ore concentrate, rolled steel stock, steel pipe, steel wire, sulfuric acid and oxygen were put into operation. Organizations belonging to Glavyuzhuralstroy [Main Administration for Construction in the South Ural Economic Region], Glavsevkavstroy [Main Administration for Construction of Enterprises in the North Caucasus], Glavkuzbasstroy [Main Administration for Construction in the Kuznetsk Coal Basin], Kursktyazhstroy [Kursk Heavy Industry Construction] and Glavorenburgstroy [Main Administration for Construction in Orenburg] all dealt with plans for ferrous metallurgy projects.

From the first months of the year, the builders of the largest blast furnace in the world, in Cherepovets, worked at a high rate of speed. There a clearcut production control system has been set up, careful engineering preparations have been made, and a multiple work crew contract has been introduced. The participants in this "working relay race" are competing under the motto "Complete Each Object in the Complex 10 Days Ahead of Schedule." There is no discrepancy between their words and their deeds: they are carrying out their plan successfully, they finished the foundation for the assembly of the control panel building ahead of schedule, they have put a 400-seat dining hall into operation, and they poured the concrete for the foundation (stump) under the furnace in the record time of 42 hours.

Residential construction is proceeding actively. The branch's workers have received more than 200,000 square meters of living space.

On the whole, however, the construction of ferrous metallurgy projects cannot be regarded as satisfactory. In the first quarter the construction and installation work plan was underfulfilled by almost 20 million rubles. None of the construction ministries, with the exception of USSR Minstroy [Ministry of Construction], was able to fulfill the plan established for the branch. Only 72 percent of the plan for the introduction of capacities was fulfilled. Of particular concern is the fact that the construction of more than one-third of the particularly important projects under construction is behind schedule.

The greatest lag has been allowed by organizations belonging to USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] that are engaged in building the rail-shoring shop at the Saldinskiy metallurgical plant in Sverdlovsk Oblast and complexes for the production of marketable limestone at the Studenovskoye ore administration in Lipetsk Oblast and iron ore and concentrate at the Mikhaylovskiy GOK in Kursk Oblast. Organizations belonging to USSR Minpromstroy



[Ministry of Industrial Construction] are working too slowly on the equipment for the production of polymer coatings at the Lys'va metallurgical plant in Perm Oblast.

This situation can be explained largely by the fact that the construction ministries and the local party and economic agencies did not insure a timely concentration of labor and material resources for these construction projects and that the forces are being dissipated over numerous construction sites. Checks have shown that flaws in the organization of construction production work are being eliminated too slowly on some projects already under construction, engineering preparation is being carried out unsatisfactorily, manual labor is flourishing next to the most modern technology, and people are losing up to 30 percent of their working time. The rule that a construction project should not be begun until careful engineering and organizational preparation for the work has been completed is far from being observed at all locations.

The situation on individual ferrous metallurgy construction projects is aggravated by an unsatisfactory supply of metal construction materials, equipment and rolled metal goods. For instance, enterprises belonging to USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] delayed the delivery of metal construction materials to projects at the Stoylenskiy GOK, the Oskol'skiy electrometallurgical combine, the Khartsyzsk pipe plant and a number of others.

Some machine building plants are hampering equipment delivery schedules. In particular, this is delaying the completion of projects already under construction at the Marganets, Stoylenskiy and Mikhaylovskiy GOK's, the Donetsk metallurgical plant and the Volzhskiy pipe plant. Enterprises belonging to USSR Minchermet [Ministry of Ferrous Metallurgy] underdelivered almost 50,000 tons of rolled steel stock to USSR Minmontazhspetsstroy for the production of metal construction materials. All of this requires the implementation of operational measures by the assembling organizations of USSR Gosstab and the appropriate ministries.

From the results of the work done in the first months of the year it is necessary to extract lessons, and the situation at each construction project already under way should be analyzed thoroughly. First of all, measures must be implemented for projects that were planned to be introduced into operational use in the second and third quarters. These are the complexes under construction at the Kostomuksha GOK, the Magnitogorsk combine, the Novolipetsk and Chelyabinsk metallurgical plants, the okomkovaniye [translation unknown] shop at the Oskol'skiy electrometallurgical combine, the tin shop in Temirtau, the superpure iron powder shop at the "Sibelektrostal'" plant and others.

Reports from leaders of construction and installation organizations and metallurgical enterprises on questions related to accelerated work and insuring the unconditional introduction into operational use of capacities under construction, as well as projects of residential, cultural and domestic importance were discussed recently at ministry board meetings. At joint meetings of the Party Committees of USSR Mintyazhstroy, USSR Minmontazhspetsstroy and USSR Minchermet, there were discussions of the question of increasing the participation of the communists in the ministries' central staffs in supporting the assignments for the construction of this branch's projects. These measures will undoubtedly facilitate the fulfillment of assignments facing the builders of ferrous metallurgy projects.

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## AGRICULTURAL CONSTRUCTION

### INTERKOLKHOZ BUILDERS IN NONCHERNOZEM REGION DISCUSSED

Moscow SEL'SKOYE KHOZYAYSTVO in Russian No 7, Jul 82 (signed to press 15 Jun 82)  
pp 1-3

[Article by V. Popov, first deputy chairman of the board of the Roskolkhoz-stroyob'yedineniye: "Interkolkhoz Builders Help the Nonchernozem Region" under the rubric "For a Worthy Welcome of the 60th Anniversary of the USSR!"]

[Text] Ever since the CPSU Central Committee and the USSR Council of Ministers had adopted the resolution "On Measures to Further Develop Agriculture in the Nonchernozem Zone of the RSFSR," truly tremendous changes have taken place in the life of the rural toilers of the Nonchernozem Region, as in that of the entire Soviet people. Thanks to the unflagging concern of the CPSU Central Committee and the Soviet government, the material-technical facilities of the kolkhozes and sovkhoses have been markedly strengthened, agricultural output has increased and the living and cultural standards of the rural toilers have risen to a new level.

The transformation of the agriculture of the Nonchernozem Zone of the RSFSR has become a truly nationwide task.

During the 1976-1980 period alone more than 31.2 billion rubles of capital outlays was allocated to the development of that agriculture. This is greater by a factor of 1.6 than in the 9th Five-Year Plan period. Plans exist to invest the same volume of state and kolkhoz-cooperative outlays during the 1981-1985 period.

The successful implementation of the program for transforming the agriculture of the Nonchernozem Zone during 1976-1985 and in the long run until 1990 will be largely determined by the level and scale of capital construction. It is thus not accidental that virtually all the construction ministries and departments, both Union and republic, including the All-Russian Association of Interkolkhoz Construction Organizations [RSFSR], are being mobilized to fulfill this program following its approval.

In the Nonchernozem Region at present operate 26 republic (and ASSR) and oblast interkolkhoz construction associations, 8 general construction trusts and administrations, and 28 specialized road building trusts, established early in the 10th Five-year Plan period. The total number of primary organizations has grown to 1,003, which is greater by a factor of 1.4 than it had been in 1975. They operate at 4,777 kolkhozes and 2,670 sovkhoses. The growth in the numbers of construction organizations has been accompanied by qualitative changes: the mean volume of operations and state of equipment per mobile mechanized construction column have increased, the skills of the workers are higher, and the quality of construction and installation operations as well as of the products fabricated has improved.

Faced with the task of markedly accelerating the rate of rural capital construction, the Roskolkhozstroyobyedineniye [All-Russian Association of Interkolkhoz Construction Organizations (RSFSR)] had to take urgent steps to prioritize the expansion of its own production facilities on a scale capable of meeting the needs of construction organizations for structural components and building materials, as well as of meeting the needs of industry for raw materials. Measures are being implemented to provide the necessary working, housing and living conditions for workers, to streamline the structure of management and to develop cadres of highly skilled builders.

During the years 1975-1981 2,038.5 million rubles in capital outlays was allocated for developing the construction and building materials industries in the Nonchernozem Region of the RSFSR. During that period 65 large enterprises of these industries were built for the Roskolkhozstroyobyedineniye; 2,272,000 sq m of dwelling area and preschools accommodating 6,000 children were released for occupancy, and the network of public feeding at the existing enterprises of the system was expanded.

The aggregate capacities of the enterprises of the interkolkhoz construction organizations in the Nonchernozem Zone at present amount to: 2,746,000 cu m of precast reinforced concrete annually; 971,000 cu m of lightweight aggregates; 620 million nominal wall-material bricks, more than 4.5 million cu m of rubble and gravel, and 5.1 million sq m of joinery products--all annually. The volume of the procurements and shipments of deal board has grown to 1,460,000 cu m. Own housing stock has grown by a factor of 2.2, reaching 3,305,000 sq m of dwelling area, or 16 sq m per worker. Fixed assets, both production and non-production, increased by a factor of 2.3 and, as of 1 January 1982, exceeded 2 billion rubles.

Much work has been done to provide construction and road-building organizations with high-capacity machinery and equipment. In the period since the promulgation of the aforementioned resolution of the CPSU Central Committee and the USSR Council of Ministers, interkolkhoz construction organizations of the Nonchernozem Region were provided with more than 30,000 trucks, 3,820 excavators, 4,643 bulldozers, 2,036 scrapers, 1,376 motorized graders, 1,482 wheeled cranes, and much other equipment. As a result, the state of the equipping of construction increased from 10.6 percent in 1975 to 22.9 percent in 1981.

The existence of well-equipped own production facilities enabled the interkolkhoz construction organizations to largely industrialize rural construction. A total of 26 rural construction combines was set up in the Nonchernozem Region; as a rule, they operate on the basis of an integrated production cycle, fabricating complete sets of buildings, installing and finishing them, and releasing them for use to customers.

Much work to improve the technology of the production of residential buildings from keramzit-concrete panels, refine the integrated cycle of production, elevate the level of the offsite readiness of products and shorten the construction cycle has been accomplished by the Kostroma and Kalinin SSKs [rural construction combines], the Kama SSK of the Udmurt Association, the Gusevskiy SSK of the Kaliningrad Association, the Kanash and Cheboksary SSKs of the Chuvash Association, and many others. Definite experience in the fabrication and assembling of residential buildings from arbolite structural components has been gained at the Gor'kiy, Sverdlovsk, Smolensk, Kirov and Vologda associations.

Rural construction began to be increasingly based on the use of prestressed reinforced concrete products, vibrated brick panels, lightweight-concrete and arbolite products, pile foundations, heating networks not requiring the installation of pipe, structural components with seamless joints, etc. The level of fully prefabricated construction at interkolkhoz construction organizations of the Nonchernozem Region in 1981 had reached 53 percent, of which 65 percent of the construction of rural production facilities and 45 percent of housing construction.

All this had enabled the interkolkhoz construction organizations during 1975-1981, in the Nonchernozem Region, to carry out 6,582.5 million rubles of subcontracted operations and put into operation the following animal husbandry premises: 2,473,500 stall vacancies for cattle, poultry premises accommodating 3.5 million fowl, warehousing facilities accommodating 3,215,500 tons at a time, mixed-fodder enterprises and shops with a capacity of 10,500 tons of fodder daily, and repair and machine shops handling 45,600 conditional repairs annually. A total of 4.3 million sq m of dwelling area was released for occupancy, along with preschools for an enrollment of 506,500, elementary schools for an enrollment of 126,900, and clubs and houses of culture seating a total of 87,800 persons. In addition, 14,500 km of hard-surfaced motor roads and more than 1.0 million sq m of takeoff and landing runways were built.

Many interkolkhoz construction associations have been growing at an extremely rapid rate. The volume of subcontracted operations handled by, for example, the Sverdlovsk Association grew from 28.4 million rubles in 1974 to 52.2 million in 1981; by the Mari Association, from 30 to 41.9 million rubles; by the Vladimir Association, from 16.1 to 32.1 million rubles; by the Kostroma Association, from 19.8 to 42.8 million rubles; by the Udmurt Association, from 22.5 to 43.8 million rubles; and by the Mordovian Association, from 29.9 to 51.5 million rubles. All these associations have successfully fulfilled their plan targets as to the basic technical and economic indicators.

The concentration and specialization of agricultural production have entailed an increase in the unit capacity of the production facilities erected, as well as an increase in the capital outlays required and the value of fixed assets, along with an expansion of the comprehensive, integrated build-up of rural settlements, which is now carried out in accordance with the developed master plans.

Problems of the construction of housing and cultural, communal, consumer-service, and shopping facilities currently rank highly in the activities of the interkolkhoz construction organizations. Making the village beautiful, with a distinctive architecture, good roads, sidewalks, flowerbeds, lawns and architectural adornments, as well as planting trees and bushes and providing rural toilers with well-built dwellings containing all the amenities and utilities, not inferior in comfort to urban dwellings, and also providing the conditions for cultural entertainment and recreational sports--such are the problems on which at present the interkolkhoz construction and design organizations are focusing their efforts jointly with agricultural workers.

The Roskolkhozstroyob'yedineniye has done much to improve the design, construction and amenities of rural settlements. Currently the interkolkhoz design institutes have in the main completed drafting project designs for the planning and build-up of the growing kolkhoz and sovkhos settlements in the Nonchernozem Region. Many rural



settlements participating in the all-Union [architectural] contest were highly commended and some of them were granted certificates and diplomas of the USSR VDNKh [All-Union Exposition of Achievements of the USSR National Economy].

When we speak of integrated rural build-up we mean that the construction of housing in a settlement is at the same time accompanied by the construction of schools, hospitals and preschools. The central area of the settlement is planned and, as a rule, it includes a modern shopping center, a consumer services building, a Palace of Culture, a canteen and various other buildings. Such build-up may be exemplified by that of the village of Serkovo in Gorodetskiy Rayon and the village of Kholyaino in Bol'shemurashkiy Rayon, Gor'kiy Oblast, and also of the village of Vyatskoye, Sovetskiy Rayon, Mari ASSR, the village of Petushki, Sysertskiy Rayon, Sverdlovsk Oblast, and many others.

At the same time, the interkolkhoz construction organizations of the Nonchernozem Region also display major shortcomings in performance. The plan of subcontracted construction and installation operations for 1975-1981 was fulfilled only 96.5 percent, with the shortfall amounting to 204.5 million rubles. Also underfulfilled was the completion of clubs and houses of culture (82 percent), preschools (96 percent), motor roads (94 percent) and takeoff and landing runways (48.2 percent).

The norms of the duration of the construction of the own production facilities of these organizations are being violated. Thus, the Sergach SSK of the Gor'kiy Association is still under construction for the 8th year in a row, although the norm is 36 months. During that time, it has utilized only 4.8 million rubles of the estimated construction cost of 6.4 million. A similar situation applies to the construction of the Torvbeyevskiy SSK of the Mordovian Interkolkhoz Construction Association, the second section of the Kirov SSK, the Yaranskiy SSK in Kirov Oblast, the Kuvshinskiy Rubble Plant in Sverdlovsk Oblast, etc. Some of the industrial enterprises and rural construction combines built during these years operate considerably below capacity and with an insufficiently effective yield. Thus for example in 1981 capacities for the production of precast reinforced concrete were utilized only 71.3 percent; wall materials, 56 percent; extraction of rubble and gravel, 71 percent. At many associations the profitability of the construction process and especially of industrial production remains low, with the yields of fixed assets declining year after year and machinery and equipment being poorly utilized.

Certain rural construction combines such as the Kirovskiy, Lvenskiy, Pogrebskiy, Kalininskiy, Ivanovskiy, Ar'yevskiy, Sovietskiy and others, have not yet become major factors in implementing the tasks for the industrialization of housing, cultural and communal construction. In some of them the modernization and retooling of technological lines to the fabrication of large-panel buildings proceed too slowly and effective measures are not being taken to organize specialized teams and PMK [mobile mechanized construction columns] and equip them with high-capacity machinery. The level of organization of the industrial construction conveyor still remains very low. That is why the capacities of these and various other SSK's are poorly utilized and do not yield the desired effects.

At some interkolkhoz construction associations the responsibility of executors for the assigned tasks is limited, adequate measures are not being taken to strengthen work and production discipline, little educational work is done among the workers, socialist competition is sluggish, and the aktiv of workers, engineers and technicians are not adequately enlisted for participation in the management of production. This situation cannot be tolerated and must be remedied, the sooner the better.

Major and responsible tasks face the interkolkhoz construction organizations in 1981-1985. They will have to carry out 5.8 billion rubles of subcontracted construction and installation operations, which is greater by a factor of 1.3 than during the 10th Five-Year Plan period. Further, they will have to complete 6.1 billion rubles of construction, thus reducing the volume of uncompleted construction to 65 percent. During that period, it will be necessary to put into operation a large number of animal husbandry premises, granaries, facilities for the storage of potatoes and vegetables, mineral fertilizer depots, repair and machine shops, and mixed-fodder enterprises. Plans exist to build dwelling area aggregating 6,054,000 sq m, which is greater by a factor of 2.1 than in the preceding five-year plan period, as well as to build schools for an enrollment of 68,900, preschools for an enrollment of 86,700, clubs and houses of culture accommodating 133,000 spectators, and 15,389 km of hard-surfaced motor roads. All of the increase in the volume of the subcontracted construction and installation operations is to be accomplished through an increase in labor productivity.

The drafting of organizational and technical measures and practical work should primarily proceed from the premise that conditions should be provided for a marked rise in the technological level of rural construction and its industrialization on the basis of the partial and complete assembling of buildings and structures from prefabricated components with a high degree of offsite readiness, a maximum mechanization of production processes, shortening of construction cycles, and the introduction of the achievements of science and advanced knowhow into the construction process. The Roskolkhozstroyob'yedineniye is posing the task of increasing the volume of the complete on-site assembling of prefabricated components from 53 percent in 1981 to 68 percent in 1985. The use of loadbearing structural components and partitions based on lightweight aggregates should be correspondingly increased from 226,400 cu m to 456,500 cu m; prestressed reinforced concrete structural elements, from 171,500 to 394,300 cu m; and arbolite structural elements, from 26,000 to 145,000 cu m.

The universal transition to the prefabrication and erection of large-panel and modular-unit residential, public and communal buildings from keramzit concrete, arbolite, triple-layer plywood components, gypsum-concrete, and lumber is the major direction of the technical policies as regards the further industrialization of the construction of non-production structures, and it also harbors a tremendous potential for rapidly expanding that construction.

Urgent steps should be taken to radically improve the performance of industrial enterprises serving as the basis of the entire construction process, and to increase industrial output at a faster rate than that of capital construction. Only then it will be possible to maximally meet the growing demand of construction organizations for structural elements and materials, and to gradually eliminate the related shortages.

Interkolkhoz construction organizations should use more broadly a new form of brigade organization--the brigade system of the organization and stimulation of labor as based on a combined-skills team/. Thus while in 1981 this system accounted for 378 million of construction and installation operations, which is 39 percent of the total volume, by the end of the five-year period it should spread to at least

49 percent of the work force, which is to perform at least 690 million rubles of construction and installation operations. The conversion of the brigades to this cost-effective principle has justified itself not only in construction but also in industry, in transport, and in logging and lumber processing. The new brigade system is the most widespread in the Sverdlovsk, Yaroslavl, Moscow, and various other associations. Mean output per cost-effective brigade is, as a rule, greater by a factor of 1.5 than in conventional brigades.

On the construction sites in the Nonchernozem Region turnover of the labor force still is high and absenteeism and tardiness for trivial reasons still occur.

All this indicates that we have as yet worked little with the people, that we pay insufficient attention to their needs and wishes. On-the-spot checks established that normal working and living conditions are not always nor everywhere provided for workers. All this prompts them to resign and transfer to other organizations. The question of working with the people should always lie in the forefront of the attention of every administrator and every engineer and technician.

The interkolkhoz construction organizations, including the specialized road-building trusts as well, operate under difficult conditions. The large number of projects simultaneously under construction and their considerable territorial dispersion impede plan fulfillment to a definite extent. Moreover, certain associations are short of rubble, petroleum bitumen, Metlach /ceramic floor tiles/ and facing tiles, linoleum and other materials. In the present situation, the wise manager turns to the collective for help in solving the problems that arise. In this connection, roadside quarries should be developed more boldly and operatively, work should be done to strengthen roadbeds with lime and cement, Metlach and glazed tiles should be supplanted with other facing materials, the production of parquet floorings and board should be organized, and so on. It is important to study the experience of the pace-setting collectives and assimilate it where needed on construction sites.

The first year of the 11th Five-Year Plan has been successfully fulfilled by the work force of the All-Russian Association of Interkolkhoz Construction Organizations /RSFSR/. the task now is to eliminate the existing shortcomings in performance and, on maximally utilizing the colossal internal potential, assure the fulfillment of the plan and pledges for the second year of the current five-year plan and welcome in a worthy manner the 60th anniversary of the USSR.

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## AGRICULTURAL CONSTRUCTION

### MINISTER DISCUSSES RURAL CONSTRUCTION

Moscow STROITEL' in Russian No 9, Sep 82 pp 1-3

[Interview with Stepan Dmitriyevich Khitrov, USSR minister of Rural Construction: "The Main Task of Rural Builders"]

[Text] A significant role in the implementation of the USSR Food Program is assigned to collectives of construction projects of the USSR Ministry of Rural Construction. The magazine's editorial staff asked Stepan Dmitriyevich Khitrov, USSR minister of rural construction, to answer questions that indicate the ministry's contribution to this immense statewide cause.

It is known that the USSR Ministry of Rural Construction has grown in recent years into a powerful general contracting organization in rural areas which employs more than a million workers.

[Question] What are the main tasks in the development of the agro-industrial complex that the ministry carried out before the May (1982) Plenum of the CPSU Central Committee and what basically will be done by 1990 for rural construction in light of the decisions of the Plenum of the CPSU Central Committee?

[Answer] Since the March (1965) Plenum of the CPSU Central Committee which determined the long-term program for the development of agriculture in the country and the restructuring of rural areas, it has been necessary to take measures for the development of rural construction that have been unprecedented in scope. In this connection one should take note of the great significance of the decision adopted on the initiative of Leonid Il'ich Brezhnev in 1967 regarding separating rural construction into an independent branch and creating a specialized union republic ministry for rural construction.

The system of the USSR Ministry of Rural Construction, which has taken a path of accelerated development during a short period, is presently a broad network of contracting organizations that carry out construction throughout the territory of the entire country. The ministry has 312 construction and installation trusts in operation, 3,500 local construction and installation organizations and more than 500 industrial enterprises.



The consolidation of construction organizations and the creation of a specialized construction industry in agriculture made it possible to double the volume of contracting work done by the USSR Ministry of Rural Construction and to increase it to 5.2 billion rubles a year. In 1990 this volume is to be increased to 7 billion rubles. The ministry's tasks in the eastern regions of the country are increasing considerably.

During the years that have passed since the March (1965) Plenum of the CPSU Central Committee the ministry's construction organizations have performed 65 billion rubles' worth of contracting work (with an average annual increase of 4.6 percent), more than 90 percent of which was related to the development of branches that determine success in carrying out the Food Program.

We have put into operation 935 large animal husbandry complexes that operate on an industrial basis, and 432 poultry farms for producing poultry meat and eggs with a capacity of 33 million laying hens and more than 252 million broilers. About 900 enterprises of the food, meat and dairy and other branches of the processing industry have been constructed, and new capacities have been created at reconstructed canning plants, sugar refineries, meat combines, and cheese enterprises.

In recent years the construction of these enterprises has moved farther into the remote regions of the country--to the sources of agricultural raw material.

Collectives of rural construction workers are working persistently to fulfill the large program for the construction of elevators, mills and mixed feed combines, grain plants and fruit and vegetable storehouses.

No single country has ever before constructed as many elevators in such a short period of time. These are mainly highly mechanized modern enterprises for storing and processing grain with capacities of up to 150,000 tons.

Such large enterprises have gone into operation as, for example, the combine for processing rice in Kzyl-Orda which can annually provide consumers with up to 800 tons of rice, the mixed feed plant in Volosovo with a productivity of 1,000 tons a day, the milling combine in Belaya Tserkov' which produces 500 tons of flour a day, and many others.

One cannot say that there have been no shortcomings in this large amount of work: the fulfillment of the immense volume of construction work on these facilities has been frequently impeded by difficulties in the supply of equipment.

When solving problems of agricultural production construction our Party has been unwaveringly concerned about the creation of the necessary housing and cultural-domestic conditions for those who are participating directly in the implementation of the Food Program--rural workers.

Organizations of the USSR Ministry of Rural Construction have constructed and reconstructed settlements of many sovkhozes and put into operation residential buildings with an overall area of almost 72 million square meters as well as 11,600 general educational schools and vocational and technical schools, and

also a large number of hospitals, polyclinics, children's preschool institutions and other facilities for cultural and domestic purposes.

This year alone the USSR Ministry of Rural Construction will put into operation more than 500 children's preschool institutions, 120 hospitals and polyclinics, and 600 schools. Now every third school under construction in the country is being constructed by organizations of the USSR Ministry of Rural Construction.

[Question] You, Stepan Dmitriyevich, have already announced in the press and spoken about the significant strengthening in recent years of the production and technical base for rural construction. What is the production base for rural construction workers like today and what will be undertaken in the matter of developing rural construction combines and rural house building combines?

[Answer] The Party Central Committee and government are constantly devoting attention and rendering assistance in the development and improvement of the production and technical base for rural construction. From the time of the creation of the USSR Ministry of Rural Construction the production capacities for the basic kinds of designs, items and materials has increased: reinforced concrete--3.7-fold, and carpentry items--2-fold. New capacities have been created for producing porous fillers, metal construction components, prepared parts for installation, wood veneers, wood floor coverings, asbestos cement structures, heat insulation materials and other materials.

Today the USSR Ministry of Rural Construction has capacities for producing 13.6 million cubic meters of reinforced concrete items, including more than 3 million cubic meters for large-panel and large-block housing construction, and for producing parts for 722,000 cubic meters of elevator construction, which makes it possible to provide for the delivery of sets of parts for the construction of 9-10 million square meters of overall space in agricultural buildings, 6-7 square meters of residential buildings and other facilities.

The industrial enterprises that have been constructed during the years of the 9th and 10th Five-Year Plans have a fairly high degree of technical and technological equipment. In the area of the technology of manufacturing reinforced concrete items for large-panel housing construction, the main role is played by conveying lines for manufacturing wall structures, and caisson production of bearing and self-bearing wall panels and partitions. The manufacture of hollow panels for coverings and floors between stories and also ventilation blocks and the completion of items are done with aggregate floor line technology utilizing modern forming machines and vibration areas.

As an example of the high technical equipment one can give the enterprises and rural construction combines located in Belye Berega in Bryansk Oblast, Gorki, Engel's in Saratov Oblast, Berezo in Brest Oblast, Melitopol in Zaporozhe Oblast, the village of Belovodskoye in the Kirghiz SSR and others.

Construction is being completed on large woodworking combines in Vologda and Petropavlovsk with an overall capacity of 900,000 square meters of carpentry items. They are equipped with semi-automated lines and the technology used at these enterprises makes it possible to produce carpentry items with complete plant readiness.

In order to provide for fulfillment of the tasks arising from the decisions of the May (1982) Plenum of the CPSU Central Committee concerning the USSR Food Program, it is necessary to continue to observe the previously adopted principle of making sure that the growth rates of the capacities of the production base of the ministry are higher than the growth rates of the planned volumes of construction and installation work. Thus with respect to reinforced concrete, by 1990 it is intended to increase production capacities by 44 percent, including doubling the capacities for large-panel housing construction; for porous fillers--by 32 percent; for steel construction parts--by 30 percent; for carpentry items--by 35 percent; installation parts--3-fold, and mechanization bases--1.8-fold.

The enterprises that have been earmarked for construction, reconstruction and technical re-equipment will have an even higher level of mechanization and automation of production processes and will provide for the output of sets of construction elements with complete plant readiness.

Taking into account the fact that the increased volumes of rural construction under the 11th Five-Year Plan and in the future should be carried out without increasing the number of workers in the branch, in order to achieve the goals that have been set it is necessary to further improve organizational forms of administration of rural construction that are related to more efficient utilization of the capabilities and reserves of the production base. In the network of specialized organizations that is being developed by the ministry an important role is assigned to rural construction combines (SSK) and rural housing construction combines (SDSK).

The main features of the operation of the SSK and SDSK consists in that here the efforts of the production base are entirely directed toward maximally providing construction workers with sets of elements delivered on schedule for flow line construction, since the final result of the activity of the rural construction combine is putting the object into operation. This stimulates the production of elements with high plant readiness as well as their standardization, and contributes to increasing the full prefabrication of construction and, of course, labor productivity. The work experience of the leading rural construction combines such as the Slutsk SSK of the Bel. Russian SSR Ministry of Rural Construction and the Kalinin and Maritime SSK's of the RSFSR Ministry of Rural Construction has shown that increased volumes of work, increased labor productivity and reduced time periods for construction in these organizations significantly surpass the average indicators for the branch as a whole.

During the past five years the volume of construction and installation work performed by SSK's and SDSK's has increased three-fold. In 1981 it amounted to 250 million rubles' worth and 1.4 million square meters of production area of agricultural buildings and 860,000 square meters of overall dwelling space were put into operation.

[Question] From your answer it is clear that the ministry has created a powerful production base which provides for industrial methods of production work. How is this reflected in the level of technical development of rural construction?

/Answer/ The development of the production base has made it possible to provide for further raising the technical level of rural construction.

Technical development under the 11th Five-Year Plan is being carried out in keeping with the decree of the CPSU Central Committee and the USSR Council of Ministers of 26 August 1971 "On Improving Planning and Construction of Agricultural Facilities and Strengthening the Production Base of Rural Construction Organizations" and a number of other decrees that have been issued since 1971. As a result of the direction that has been taken toward completely prefabricated construction with preferential utilization of light-weight elements made of effective materials, light-weight reinforced concrete frames and ribbing are being used on a large scale, including all-purpose covering slabs, pile columns and driving blocks of large sizes, including with complete plant readiness, wall panels, wood veneer framework, arches and beams, asbestos cement framing and extrusion nonframing panels, large elements for silage structures, light metal elements for delivery in sets, prefabricated elements for technological purposes (troughs, feeders and fences), and industrial elements of floors and partitions. We have begun to change over to using industrial roofing, compact cleaning installations, block installation of boilers and other effective devices.

During the last five-year plan we used efficient light-weight elements to construct about 30 million square meters of production base in buildings for agricultural purposes (twice as much as during the period from 1971 through 1975). Last year we constructed 6.8 million square meters. One of the most important problems was solved: to provide for mass industrial construction of rural production buildings. While in 1975 the proportion of the use of fully prefabricated elements on these buildings was equal to 52.5 percent, in 1981 it amounted to more than 70 percent.

New developments in assembling agricultural production buildings without welding are of interest. The construction of experimental facilities in Slutsk and Novosibirsk confirmed the promising nature of such solutions. The development of these solutions is continuing. In 1981 buildings with an overall space of almost 10,000 square meters were assembled without welding and it is intended to increase this indicator 7-fold in 1982.

The effectiveness of using sets of light-weight elements based on wood and aluminium is also shown by the experience in the construction of such large poultry farms as Yasnaya Polyana in Stavropol Kray and Orel'skaya in Dnepropetrovsk Oblast.

A large reserve for increasing labor productivity in the construction of rural production facilities lies in changing over to erecting fully prefabricated buildings for auxiliary purposes (dairy and veterinary blocks, boilers, transformers and so forth), and also in raising the level of prefabrication and plant readiness of buildings for basic purposes. To this end, by a joint order of the USSR Ministry of Rural Construction, the USSR Ministry of Agriculture, the USSR Goskomsel'khoshtekhnika and the USSR Ministry of Machine Building for Animal Husbandry and Fodder Production, a program was approved for improving existing standard designs for agricultural production buildings. In the near future it is intended, in conjunction with the USSR Ministry of



Agriculture, to complete work on preparing designs for fully prefabricated buildings and structures for auxiliary purposes that are part of animal husbandry and poultry farms and complexes, using a unified limited list of items, and for raising the level of prefabrication of rural production buildings for basic purposes using prefabricated floors, partitions, side walls, and elements of technological equipment.

The work conducted in conjunction with the USSR Ministry of Agriculture for standardization of dimensions of buildings was very important for the industrialization of the construction of rural production buildings. It made it possible to reduce the number of these from 120 to 22. Also very important is the periodic revision of existing lists of standard designs by the USSR Ministry of Agriculture.

In 1981 68,000 square meters of production space in buildings were constructed with an increased level of prefabrication. It is intended to increase this volume of construction to 250,000 square meters in 1982.

In elevator construction practically all of the elevator capacities are being constructed from industrial designs. The buildings are arranged in blocks and the planning of the silos is economical. The structures are being enlarged. Prestressed fittings are being introduced. Prefabricated single-unit elements are being used for the foundations instead of solid slabs and prefabricated elements are being used for the floors of the various levels of the silos. Constructional protection of the joints of reinforced elements is being extensively introduced and solid elements of receiving areas of elevators are being replaced with prefabricated solid elements using universal perforated blocks. Principally new solutions for building metal silos are being tested.

The ministry is working on improving the quality and the industrialization of housing and civil construction. In 1981 1.76 million square meters were put into operation in buildings with large-block construction. The proportion of completely prefabricated housing construction reached 39.4 percent.

We are continuing to verify solutions for residential buildings which use light-weight elements made of asbestos cement sheets, water resistant veneers and so forth which were developed in series 209 of designs for residential and public buildings. The first enterprise for producing buildings of series 209 in the country is in operation in Lazurnaya in Kalinin Oblast. Wooden panel buildings of series 139 are being manufactured for construction in regions of the Far North.

The use of panel elements for the construction of public buildings, mainly schools and preschool institutions, is expanding. In 1981 these solutions were used to construct public buildings with an overall space of 398,300 square meters. The use of large-block elements is being increased in the construction of public buildings. In 1981 they were used for 185,600 square meters of overall space that was put into operation. Under the last five-year plan the proportion of fully prefabricated public buildings increased from 6 to 20 percent.

As a result of the measures taken by the ministry for developing the production base, the proportion of fully prefabricated construction in the overall volume of work that was done--one of the main indicators of the technical level of construction--was 56.6 percent in 1981 as compared to 39.8 percent in 1975 and 13.2 percent in 1970.

The past period has fully confirmed the correctness of the main principles that were established by the ministry for improving the industrial base.

[Question] Capital investments in the development nonchernozem zone of the RSFSR increase from year to year. Which main problems in this area will be solved before 1990?

[Answer] An important place in carrying out the Food Program is allotted to the nonchernozem zone of the RSFSR. The Party and the state are showing special concern for the development of its economy. Several years ago a long-term program was developed for advancing agriculture and improving housing and cultural-domestic construction in the towns and villages of the zone.

A large volume of construction and assembly work is being done in this zone. In terms of its scope, the size of the territory and the volume of capital investments, this program has no equal, and the USSR Ministry of Rural Construction is playing a significant role in carrying it out.

A good deal has been done in this area recently. New well-arranged villages have been constructed and modern complex for producing meat and milk, mixed feed plants, mineral fertilizer storehouses and facilities of the processing branches of industry have been put into operation.

During the years of the 10th Five-Year Plan alone organizations of the ministry carried out contracting work on agricultural facilities in the nonchernozem zone in a volume of 2 billion rubles, a 27 percent increase over the 9th Five-Year Plan, and constructed residential buildings with an overall area of almost 5 million square meters, children's preschool institutions to accommodate more than 390,000, and schools to accommodate 158,000.

Primary attention is devoted to strengthening and developing the internal production base of construction organizations in the nonchernozem zone of the RSFSR. As a result of measures that have been taken, during the period since 1976 the capacities for prefabricated reinforced concrete increased 2.8-fold and for large-panel housing construction--1.6-fold.

Large enterprises have been constructed and put into operation for producing wood veneer elements in Arkhangelsk, Kalinin, Vologda and Gorki oblasts, and plants for large-paneled housing construction have been put into operation in the Udmurt ASSR and Smolensk, Bryansk, Kaliningrad and a number of other oblasts of the nonchernozem zone of the RSFSR. There are 15 SSK's and SSK's in operation and another 12 SSK's and SSK's will be created before the end of the 11th Five-Year Plan.

A long-range program has been earmarked for restructuring rural villages and carrying out large volumes of housing and civil construction, engineering work and building up of towns and villages in the nonchernozem zone.

In the sphere of industrial construction large amounts of money are being allotted for more rapid development of the base for seed growing, feed production and feed preparation, including accelerated development of the mixed feed industry and also reconstruction and expansion of existing farms and comprehensive mechanization and automation of technological processes.

Under the current five-year plan the ministry will have to increase the amount of construction and assembly work in the nonchernozem zone 1.3-fold as compared to the 10th Five-Year Plan. More than 7 million square meters of well-arranged dwelling space will be constructed for rural workers as will schools to accommodate 146,000 and many other facilities for cultural-domestic and social purposes.

These tasks will be carried out by 27 general contracting construction administrations and trusts. Union republics will render patronage assistance in carrying out the tasks for the development of the nonchernozem zone of the RSFSR. This work is being carried out actively by the ministries of rural construction of the Armenian SSR, the Azerbaijan SSR, the Kirghiz SSR, the Georgian SSR and a number of others. On the whole during the years of the 11th Five-Year Plan organizations of the union republic will assimilate more than 41 million rubles.

The scope of the work is large, but it still corresponds completely to the large-scale nature of the tasks that have been set.

Our organizations have accumulated a good deal of experience in construction in rural areas, but there are still shortcomings that impede the work.

Successful fulfillment of the plan requires, above all, improvement of planning in construction and balance of material and technical supply. We understand, of course, that the balance should be worked on not only by the Gosplan, but also by us and the local agencies. At the same time the ministry is doing more work to increase the thriftiness and efficient expenditure of material and fuel-energy resources.

The decisions of the May (1982) Plenum of the CPSU Central Committee place increased requirements not only on the work in the nonchernozem zone of the RSFSR, but also for significantly increasing the rates of construction in rural areas, raising the technical level, and increasing labor productivity. Collectives of construction organizations and enterprises, workers and engineering and technical personnel of the ministry's system in all union republics, krais and oblasts of the country should raise the organizational level of work of all units, provide for smooth operation on the basis of a steady increase in professionalism, and display even more decisiveness and persistence in overcoming various kinds of arrears, especially in the matter of introducing everything that is new and advanced: One must remember that advanced practice is valuable when it is repeated.

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## AGRICULTURAL CONSTRUCTION

### OFFICIAL DISCUSSES PROJECTED AGROINDUSTRIAL CONSTRUCTION

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[Article by A. O Stepun, deputy chief of the Summary Capital Investment Department of the USSR Gosplan: "The Construction Projects of the Agroindustrial Complex"]

[Text] The Communist Party has assigned a significant role to the construction workers in carrying out the large-scale tasks of further increasing the nation's agriculture. The Food Program approved by the May (1982) Plenum of the CPSU Central Committee includes an extensive program of capital projects in the countryside and in all the sectors of the agroindustrial complex. These projects, Comrade L. I. Brezhnev pointed out in the report at the plenum must be viewed as the nation's shock projects.

In the 11th Five-Year Plan alone, 233 billion rubles have been allocated for strengthening the material and technical base of the agroindustrial complex.

During the 12th Five-Year Plan, approximately one-third of the capital investments allocated for the development of the national economy is to go for the development of agriculture and the immediately related sectors.

As is known, agriculture is the basis of the agroindustrial complex. During the current five-year plan, around 190 billion rubles of capital investments have been allocated for its development. Here we must point out the substantial changes in the direction and structure of capital investments into agriculture. These are due to the necessity of rapidly converting to intensive farming methods, to increasing the efficiency of agricultural production as well as substantially improving the social and cultural-domestic conditions in the life of the rural workers.

Thus, while during the years of the 9th and 10th Five-Year Plans the intensive construction of livestock facilities made it possible to house 70 percent of the existing cattle in them, over 90 percent of the pigs and 60 percent of the poultry, in the 11th and particularly in the 12th Five-Year Plan the capital investments allocated for the development of livestock raising will be targeted primarily at carrying out measures related to converting livestock raising to an industrial basis by the reconstruction and full mechanization of the existing livestock farms. Along with this in virtually all the Union republics,



construction of livestock complexes and facilities for livestock will be continued. Over the years of the 11th Five-Year Plan, complexes and facilities for 10 million places for keeping cattle and 24 million places for sheep are to be put into use.

With a generally small increase in capital investments going into production construction in the countryside during the 11th Five-Year Plan, the capital investments for reclamation measures are to increase by 12 percent, for feed production and preparation by 65 percent, for creating hothouse combines, forcing frames and hothouses by 38 percent, and for building facilities for the storing of agricultural products, mineral fertilizers and agricultural processing enterprises by 63 percent.

In 1981-1990, large areas of irrigated and drained agricultural land are to be put into operation and by the end of the 12th Five-Year Plan the area of improved lands should rise to 41-44 million hectares. Over the next few years, large irrigation systems and specialized sovkhozes should be organized for producing grain in the Volga area, in the Northern Caucasus and the Ukraine, fine-staple varieties of cotton in Uzbekistan, Tajikistan and Turkmenia, as well as rice growing systems in Kazakhstan, Uzbekistan, Krasnodar Kray, the Kalmyk ASSR and the Maritime Kray. During the current decade, the creation of vegetable-dairy farms should basically be completed on irrigated lands around the large cities and industrial centers.

Major importance is given to strengthening the physical plant of feed production and preparation. During the 11th Five-Year Plan, silage and haylage facilities are to be put into operation with a total capacity of 130 million tons. The quotas will be significantly increased for completing enterprises in producing combined feeds and storage capacity for various root crops and grass meal.

The kolkhozes and sovkhozes are still poorly provided with roads and this leads to high losses of agricultural product, to the overconsumption of fuel and to the premature breaking down of the transport. The development of the road network is of major importance in solving social problems and in retaining personnel in the countryside. For this reason, the Food Program envisages that approximately 130,000 km of public roads will be built in rural localities in 1981-1990 and 150,000 km of internal farm roads.

As is known, the Food Program has given great attention to the measures of retaining the personnel and improving the sociodomic conditions in the countryside. The plan for 1981-1985 envisages that around 38 billion rubles of capital investments will go for the construction of housing, preschool institutions and other cultural and service projects in rural localities and this is 46 percent more than was provided in the 10th Five-Year Plan. The realization of these plans will provide an opportunity to increase the completion of housing by 33 percent during these years in comparison with the 10th Five-Year Plan, by 32 percent for children's preschool institutions and by 18 percent for clubs. The length of the water networks and sewage systems is to be significantly increased in the rural localities.

As before in construction of housing, cultural and service projects, priority is to be given to the RSFSR Nonchernozem Zone. In the 11th Five-Year Plan, 1.8-fold more capital investments are to be allocated for these purposes than in 1976-1980.

At the December (1977) Plenum of the CPSU Central Committee, Comrade L. I. Brezhnev emphasized that the combating of losses requires a great effort. However, it takes significantly fewer capital investments to store the already produced agricultural product than it does to produce this. Hence such a path is advantageous, it meets the party's course of increasing efficiency and most importantly conforms to the interests of the people. For this reason, it becomes evermore urgent to more rapidly develop the sectors which must ensure the prompt harvesting, transporting, processing, storage, rational utilization and delivery of the end product to the consumer.

Here it is first of all a question of the comprehensive, balanced development of agriculture and the sectors directly processing the agricultural products. During the 11th Five-Year Plan capital investments totaling around 9 billion rubles are to go for developing the food and meat and dairy industries.

In the food industry, particularly rapid development will occur in the oil and fat, macaroni, tea, starch and molasses industries while in the meat and dairy industry there will be rapid development of milk processing and this is caused by the obvious poor state existing in this sector.

The task has been set of decisively rectifying the existing situation. In 1935, almost 60 percent of the resources of skimmed milk and buttermilk should be used for food purposes and this is the equivalent of producing an additional 3.8 million tons of meat and 3.9 million tons of pork as well as a savings of billions in capital investments for the construction of livestock facilities. In order to realize these truly enormous opportunities, it is essential to more quickly increase capacity in the dairy industry for producing dry skimmed milk, whole milk substitute and dry whey.

Over the years of the 11th Five-Year Plan, we intend to complete more than 350 enterprises in the food and meat and dairy industries, including large plants with a productivity of 6,000 tons of sugar beet processing per day in Kirovograd, Vinnitsa and Khmel'nitskiy Oblasts and Moldavia, cheese factories in the towns of Mirgorod in Poltava Oblast, Voznesensk in Nikolayev Oblast, Khoyniki in Gomel Oblast, Slutsk in Minsk Oblast, bakeries in Moscow, Frunze and Barnaul, and enterprises processing dairy products in the towns of Rybnitsa in Moldavia and Gomel in Belorussia. These are to be built using complete imported equipment. Also to be built are meat packing plants for processing 100 and more tons of meat per shift in Tikhoretsk in Krasnodar Kray, Roslavl in Smolensk Oblast, Strye in Lvov Oblast and others.

For the first time in the USSR, there will be construction of a very large integrated dairy with a capacity of 1,000 tons of whole milk product output per shift in Moscow as well as dairy product enterprises using complete imported equipment in light metal element buildings in the town of Kletsk in Minsk Oblast and Kalininsk in Moldavia.

A distinguishing feature in the development of these industrial sectors during the 11th Five-Year Plan will be the creation of additional capacity primarily through the technical reconstruction and reequipping of existing enterprises. More than 3.5 billion rubles of state capital investments or almost 46 percent of their total volume will be channeled for these purposes in the food and meat and dairy industries. The increase in capacity with the technical reequipping of the existing enterprises will be carried out by employing new equipment and progressive production methods, automated control systems as well as by introducing progressive systems and equipment for mechanizing loading, transport and warehousing work.

The planned technical reequipping of existing enterprises in the food industry will make it possible to increase the production capacity of the sugar refineries by 290,000 quintals of beet processing per day, at the oil and fat plants by 670 tons of oil seed processing a day and at the primary wineries by 700,000 tons of grape processing per season. This is 40.2, 18.8 and 47.1 percent of the the completion of existing capacity carried out by the construction of new enterprises. The technical reequipping of enterprises in the meat and dairy industry will provide an opportunity to increase the production capacity of the enterprises for meat processing by 750 tons per shift, for whole milk products by 3,100 tons per shift, for cheese by 50 tons per shift, and for dry skimmed milk and whole milk substitute for feeding calves by 100 tons per shift; this is 22.9, 28.6, 24.6 and 17.3 percent of the completion of corresponding capacity due to the building of new enterprises.

During the 11th and particularly in the 12th Five-Year Plan, there will be further development in the microbiological industry which is the basic supplier of feed yeasts, protein-vitamin concentrates, lysine and other important products of microbiological synthesis important for increasing the productiveness of livestock raising. According to the estimates of specialists, the use of 1 ton of protein-vitamin concentrates in producing combined feeds will save around 5-7 tons of feed grain while the feeding of 1 ton of lysine provides the additional obtaining of 10-16 tons of pork or 8 tons of poultry meat. All of this shows the high effectiveness of capital investments into the development of the microbiological industry.

However, the demand of livestock raising for this valuable product is far from fully satisfied. In considering the great national economic importance of rapidly developing new capacity in the microbiological industry, the 11th Five-Year Plan envisages quotas for completing capacity to product 820,000 tons of feed yeasts, 390,000 tons of premixes, 16,000 tons of lysine and other products from microbiological synthesis. The Glavmikrobioprom [Main Administration for the Microbiological Industry] and the construction ministries must take measures to introduce proper order at the construction projects and strengthen the pace of work so as to ensure the unconditional fulfillment of the five-year plan quotas for building projects in this important sector.

Along with the Glavmikrobioprom, construction and expansion of shops and individual plants producing feed yeasts are also being carried out by the USSR Minlesbumprom [Ministry of Timber, Pulp and Paper and Wood Processing Industry] and the USSR Minpishcheprom [Ministry of Food Industry]. Over the years of the 11th Five-Year Plan, they should build plants with a total capacity of 65,600

tons of feed yeasts a year. This will make it possible to substantially improve the supply of agriculture with valuable additives to the animals' diet.

Regardless of the construction which has been started up, particularly in recent years, on large, highly-mechanized elevators, mill complexes, groat enterprises and combined feed plants, the demand of the national economy for the storage and processing of grain is still not fully satisfied. A solution to this important national economic problem requires a very rapid increase in capacity within the system of the USSR Ministry of Procurement.

Over the years of the 11th Five-Year Plan, the plan is to complete new major milling enterprises, elevators and combined feed plants.

In recent years, the plants of a number of industrial ministries have begun producing highly productive milling equipment which is the equal of the best world models. At present, a mill with a productivity of 500 tons of grain processing per day has been built and put into operation using this equipment in the town of Belaya Tserkov in Kiev Oblast. As a total over the years of the 11th Five-Year Plan, 30 such mills should be built including in Gorkiy, Rostov-na-Donu, Khabarovsk, Spassk Dalniy, Belogorsk, at Karpovskaya Station in Volgograd Oblast and Tikhoretskaya Station in Krasnodar Kray. In the Ukraine, similar enterprises will be built in Simferopol, Chernigov, Lutsk and the settlement of Nepolokovtsy in Chernovtsy Oblast. Large mills are also planned for other Union republics.

In the combined feed industry, the task has been set of building large combined feed plants with a capacity of 630-1,000 tons per day and, as a rule, together with mills. During the current five-year plan, combined feed plants will go into operation in Kondopog, Naberezhnyye Chelny, Buzuluk, Ashkhabad, Kirovabad, Kaluga, Liyepaye, Kreking and Alitus, at Sheksna Station in Vologda Oblast and others.

Even greater tasks in creating capacity in the flour-milling, groat and combined feed industry are to be carried out in the 12th Five-Year Plan.

In 1981-1990, there will be the further development of the physical plant of trade, procurement, storage and product processing in the Tsentrsoyuz [Central Consumer Society Union] system. Suffice it to say that during the 11th Five-Year Plan around 1.4 billion rubles of capital investments are to go to developing the food complex in this system alone. There are plans to complete 106,000 tons of refrigeration capacity and storage capacity for potatoes, vegetables and fruits for 348,000 tons of simultaneous storage. This will make it possible to increase the contribution of the consumer cooperatives to supplying the public with food.

In the 11th and 12th Five-Year Plans, there will be rapid development of the production of mineral fertilizers and plant protection chemicals. By expanding and reconstructing the existing enterprises and building new ones we intend during these years to complete extensive capacity for producing mineral fertilizers and plant protection chemicals.



These are the basic tasks in the area of capital construction related to carrying out the Food Program. In order to ensure the successful carrying out of these tasks, there must be extensive daily organizational work at the center and on the spot aimed at improving capital investment planning and the organizing of construction as well as at eliminating shortcomings in material and technical supply of the construction projects. It will be essential to alter the attitude toward the construction of enterprises and projects in agriculture and the sectors of the agroindustrial complex on all levels of capital construction leadership as well as the manufacturers and suppliers of equipment, structural elements and materials. It is essential to increase responsibility for ensuring the established construction times and the completion dates for this production capacity and projects. Here maximum attention should be paid to promptly completing those projects which will make it possible to provide the greatest increase in food product production in a short period of time.

The experience of recent years shows the need for a serious reorganization of capital construction in the sectors of the agroindustrial complex.

Unfortunately, there are numerous examples when in the individual Union republics and oblasts with sufficiently developed capacity at the construction organizations capable of carrying out a program of construction-installation work running into scores and hundreds of millions of rubles a year, the construction of relatively small uncomplicated enterprises in agriculture, the food, meat-dairy, flour-milling and grain industries is dragged out for many years.

Thus, the Golitsyno Commercial Poultry Farm in Moscow Oblast, the Chelyabinsk Commercial Poultry Farm and the Novosibirsk State Poultry Breeding Plant have been under construction for over 10 years, while the length of their construction according to the existing standards should not exceed 3-4 years. Construction has been underway for 4 years now on the commercial poultry farms designed to grow meat broiler chicks in Pskov, Kaluga and Belgorod Oblasts. Over this time, they have each used 25-30 percent of the estimated cost of construction-installation work. The USSR Ministry of Power and Electrification which is building a major lumber industry complex in Ust-Ilimsk for 6 years now (instead of the 18 months according to the standard) has been building a bakery having an estimated cost of construction-installation work of just 4.7 million rubles. The organizations of the USSR Ministry of Construction of Heavy Industry Enterprises has been building a candy factory in Alma-Ata for 5 years (instead of 2 years according to the standard), and the organizations of the USSR Ministry of Construction have been building a mill in Ashkhabad for 4 years (instead of 2.5 years).

Since 1975, the USSR Ministry of Industrial Construction has been building a milling combine in Tayshet in Irkutsk Oblast. Over the 7 years, less than 50 percent of the estimated 7.3 million rubles of construction-installation work has been used in building this enterprise. They do not intend to complete construction and begin operating flour-producing capacity this year either.

Since 1974, the USSR Ministry of Rural Construction has been building a milling combine in Tobolsk in Tyumen Oblast. With a normal construction period of 4 years, over the 8 years at this project they have utilized only about 70 percent of the estimated cost of the construction-installation work.

From what has been stated above, it can be seen that such a situation can no longer be tolerated. It is a question of honor for the millions of construction workers--workers, engineers and economic leaders--to complete all the planned projects of the agroindustrial complex on time and with high quality and make up for the lag permitted since the start of the five-year plan.

At present, the competition of construction workers for carrying out the decisions of the May (1982) Plenum of the CPSU Central Committee and the quotas of the nation's Food Program is growing wider day by day. In responding to the party's appeal to view the construction projects of the agroindustrial complex as shock ones, many construction collectives are steadily picking up the pace. They are focusing chief attention on increasing labor productivity, improving work quality and saving material and labor resources. The leading collectives have come out with a patriotic initiative to overfulfill the plans and complete many projects of the agroindustrial complex ahead of time, by the 60th anniversary of the formation of the USSR.

At present, intense work is underway in the ministries, the Union republics, the central planning bodies and on the spot to prepare a draft plan for capital construction in 1983. It is very important that in reviewing the title lists for the projects, the plans for the production and delivery of equipment and the plans for contracting construction-installation work, all the necessary conditions be created for the successful construction of projects in the agroindustrial complex.

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## HOUSING CONSTRUCTION

### ZHARIKOV, GOSSTROY OFFICIAL, ON REORGANIZATION OF VILLAGES

Kiev STROITEL'STVO I ARKHITEKTURA in Russian No 6, Jun 82 (signed to press 2 Jun 82)  
pp 1-3

/Article by N. L. Zharikov, First Deputy Chairman of UkSSR Gosstroy: "The Transformation of the Villages as an Important State Problem"/

/Text/ In the next few years the toilers of the countryside will have to accomplish the main task posed to agriculture by the 26th CPSU Congress and the USSR Food Program for the period until 1990--achieve a reliable supply of foodstuffs and agricultural raw materials to the nation so that the increase in their output would assure a further rise in the living standards of the people. Of course, this task has to be accomplished by well-trained cadres living and working under conditions meeting all the requirements of the economic and social development of rural settlements.

In this connection, the comprehensive village rebuilding program being carried out on a major scale in this country is an important state-wide issue. It includes the implementation of complex tasks stemming from the broad development of the national integrated agroindustrial complex and the need for further equalization of the material, cultural and living conditions of the toilers of town and country.

In his report at the meeting of the republic's party aktiv on 17 March 1981 comrade V. V. Shcherbitskiy, member of the Politburo of the CPSU Central Committee and first secretary of the Ukrainian CP Central Committee, stressed that: "Management at all echelons from top to bottom should become aware that this concerns a task of major importance to the state--keeping the work force in the countryside, and should attend by deeds rather than words, concretely and daily, to the solution of all the attendant problems."

That is why it is important to raise the level of the planning and build-up of rural settlements and provide the best conditions for the fruitful labor, comfortable housing and adequate recreation and cultural growth of the toilers of farm and field. This will serve to influence positively the demographic situation in the countryside, keep skilled personnel on the farms and develop rationally the production and non-production spheres.

Currently the renovation of Ukrainian villages has become particularly sweeping. In the last 10 years more than 4.5 billion rubles was spent on housing, cultural and communal construction in the republic's villages, which resulted in the construction and release for occupancy of residential buildings and hostels with a dwelling area

aggregating more than 12.8 million sq m, elementary schools for an enrollment of 1,186,000, preschools for an enrollment of 243,000, clubs and houses of culture accommodating 708,000, trade enterprises with a shopping area aggregating 1.2 million sq m, consumer-service enterprises with a total staff of 13,200 employees, and many other socio-cultural facilities. In addition, private home builders built personal homes aggregating more than 39.5 million sq m with their own resources.

On the whole, however, rural living conditions, despite their marked improvement, still lag behind urban living conditions and do not fully satisfy the needs of the rural population. Despite the relatively extensive availability of housing, the technical condition and level of amenities of many buildings are inadequate and rural settlements are still not fully provided with cultural and communal and consumer service facilities. Moreover, most of the existing facilities of this kind are concentrated in the central settlements of the kolkhozes and sovkhoses.

Guiding themselves by the decisions of the 26th CPSU Congress and the 26th congress of the Ukrainian CP, the UkSSR Gosplan and UkSSR Gosstroy have developed, jointly with the ministries and departments handling services to the rural population as well as with the oblast executive committees, a comprehensive program for the socio-economic development of the village of the Ukrainian SSR for 1981-1985 and the period until 1990. Under this program, the volume of housing construction in kolkhoz villages and sovkhos settlements is to increase by the end of 1990. Plans exist to build with state capital outlays and the own resources of the kolkhozes well-built residential buildings aggregating about 14 million sq m in dwelling area.

During the 11th and 12th five-year plan periods the construction to be accomplished in this republic should include preschools with an enrollment of 320,000, elementary schools with an enrollment of 423,000, clubs accommodating 309,000, trade enterprises with a shopping area aggregating more than 550,000 sq m, and consumer-service enterprises with a personnel of 14,200.

The overall volume of capital outlays for the construction of housing and socio-cultural facilities during that period will reach 6.12 billion rubles, which is 36 percent more than had been completed in the preceding 10-year period.

Plans exist to further elevate the level of utility systems in rural settlements, and to expand the volume of work on the installation of water supply and gas mains. By 1990 75 percent of the apartments should be supplied with liquefied gas. A responsible problem faces designers as regards developing inexpensive and effective local sewage systems and economical hot water heaters operating on both gas and solid fuel.

The extensive work to beautify rural settlements will be continued, as will be the construction of hard-surfaced access roads. In recent years major advances in road construction have been scored in Stryyskiy Rayon, Lvov Oblast, Volnovahskiy Rayon, Donetsk Oblast, and various other rayons.

The mass transformation of the architectural face of the countryside requires a substantial increase in the effectiveness and quality of the performance of design and construction organizations.



Considerable experience in rural construction has been gained in this republic. Most rural settlements have been rebuilt gradually in accordance with a single master plan, at the expense of the farms [kolkhozes and sovkhozes]. In their level of build-up and amenities they are almost equal to urban dwellings.

A number of urban-planning, typological and social tasks has been accomplished in connection with the planned comprehensive rebuilding of settlements, which made it possible to engage in a broad search for optimal architectural-layout solutions corresponding to not only the present-day but also long-range needs of the development of agricultural production and improvement in the living conditions of the population. As a result, it became possible to develop discrete settlements of a new type which combine the advantages of life in the countryside, close to nature and in tranquil and salubrious surroundings, with extensive cultural and consumer services and good transport connections with cities.

In this context, the following villages are famed far beyond the confines of the republic: Yelizavetovka and Zlatoustovka in Donetsk Oblast, Kamenka and Shcherbani in Nikolayev Oblast, Shlyakhovaya in Vinnitsa Oblast, Tsybli and Ustinovka in Kiev Oblast, Morintsy and Matusov in Cherkassy Oblast and many others.

On the farms [kolkhozes and sovkhozes] where village renewal proceeds at an intensive pace, social and cultural tasks are being successfully accomplished, labor productivity has increased, manpower migration has ceased and, what is more, the number of citizens wishing to move to and work in the countryside has grown. This is characteristic of such kolkhozes as "Ukraine" in Gorodokskiy Rayon, Khmel'nitsa Oblast (chairman: twice Hero of Socialist Labor G. I. Tkachuk), "Dawn of Communism," Rovenskiy Rayon, Rovno Oblast (chairman: Hero of Socialist Labor V. A. Plyutinskiy) and others.

These days the process of the renewal of rural settlements is approached comprehensively. This concerns the renewal of not just separately taken villages but a large number of villages within the same area units, whether within the same kolkhoz or sovkhoz or within the same administrative rayon. The great effectiveness of this approach is demonstrated by the experience gained in the design and planning of the renewal of the villages of the Kolkhoz imeni Zhdanov, Goshchanskiy Rayon, Rovno Oblast, as well as of the rural settlements in Volnovakhiyskiy Rayon of Donetsk Oblast, Stryyskiy Rayon of Lvov Oblast, Vinogradovskiy Rayon of Zakarpatskaya Oblast and Petrovskiy Rayon of Dnepropetrovsk Oblast. The number of such model settlements is rising in the republic. This experience should be disseminated more broadly.

Unflagging attention should be devoted to improving planning and layout solutions and developing an expressive and distinctive architectural face of the Ukrainian village, which has always had a distinctive folk-architecture style along with beauty of natural scenery and picturesqueness of build-up. Today we must as never before display profound understanding of the specific features of rural life and of the new trends in the economic and social development of the village, along with ability to creatively combine, in design solutions and construction practice, the best traditions of folk architecture with the achievements of modern architecture and develop a varied and visually stimulating village structure. This has been successfully accomplished in renewing the settlements of Podvirnoye in Chernovitsy Oblast, Vuzlovoy in Lvov Oblast, Chernobayevka in Kherson Oblast, and elsewhere.

As known, the development prospects and possibilities for renewal of any populated area can be adequately determined only upon considering its place in the overall pattern of settlement and the level and nature of production and cultural and consumer services in the rural administrative rayon concerned. This enhances the significance of rayon planning as an integral approach to determining the basic directions of development of every inhabited area, the rational utilization of resources and territory, the siting pattern of various national-economic facilities, the organization of cultural and consumer services as well as utilities, and environmental protection.

Currently, most rural rayons have been provided with rayon planning projects. Some of these do not, however, sufficiently allow for the aspects of development of all branches of the economy, do not tailor the intended measures to the existing possibilities, lack substantiated proposals as to the organization of the territory, adjustment of the pattern of demographic settlement and the construction of a system of cultural and consumer services, so that such projects have to be revised.

The quality and effectiveness of the project solutions largely affect the future development and architectural-artistic face of populated areas. Currently about 90 percent of the villages subject to renewal, including all central farmstead clusters of the kolkhozes and sovkhoses, have been provided with planning and build-up projects. But a large part of these projects requires revision owing to both changes in the construction facilities and insufficient substantiation of project solutions. Many projects have been drafted on the basis of obsolete premises as regards the patterns of development of rural populated areas, their size, population and density of build-up. They also have not made sufficient allowance for the process of the formation of inter-village production, labor and cultural-communal connections, for the growth in the mobility of the rural population, etc.

The design organizations should take steps to elevate the level of the technical and economic substantiation of the village planning and build-up projects and refine the methods and quality of their drafting. As for scientists, we expect from them new recommendations and proposals allowing for the modern trends of economic and socio-demographic development of the Ukrainian village.

An important element of rural build-up, and the focus of its architectural face, is the civic center. The growth of villages is continual, like that of cities. That accounts for the need to further improve the design of civic centers and add to the amenities and greenery of the villages, even of the experimental model villages whose construction has been completed.

Speaking of the centers of experimental model villages, the experience gained in building them should be critically assessed so as to avert making the same errors. This applies primarily to scale of build-up and spatial organization. The design solutions of the squares in the settlements of Korobki (1.45 hectares), Kherson Oblast, and Trushki (1.64 hectares), Kiev Oblast, which nearly equal in size the central squares of oblast cities, cannot be considered justified, and the same thing can be said of the main street in the settlement of Kodaki, Kiev Oblast, which has a 48 m wide roadway but is lined with two-story buildings.

In the villages that represent inter-village centers of production and services, the civic centers become sites to which the inhabitants of the surrounding villages

gravitate. Hence, they should be provided with good shortest-path connecting roads. The layouts of such centers should allow for access roads from motor highways. It is important that these layouts should preserve links with nature so as to provide viewers with most attractive scenic vistas. It is necessary to revise the often encountered faceless, jejune street architecture with uniformly built houses, lacking the fencing and cozy-looking no-outlet streets that have always made our villages look attractive.

The functional purpose of a populated area as regards services determines the compatibility and types of public buildings forming the civic-shopping center.

Until recently the civic-shopping centers of the villages were built to consist of, mostly, separate small buildings of the rural Soviet, the clubhouse, a store, and sometimes a school as well. At the present stage of village construction emphasis is placed on larger integrated buildings accommodating all the cultural and communal services in a single structure. This may be exemplified by the civic centers of the settlement of Kapita and village of Tsybli in Kiev Oblast and Petrovka in Crimean Oblast which were awarded prizes of the USSR Council of Ministers.

Considerable work to improve and develop rural housing construction is under way in this republic. The UkSSR Ministry of Rural Construction and the Ukrmezhkolkhozstroy /Ukrainian Interkolkhoz Construction Association/ have built facilities sufficing for constructing 500,000 sq m of dwelling area annually, which will markedly elevate the level of the industrialization of housing and public construction. For the 11th Five-Year Plan period, the network of housing construction enterprises will be expanded, with priority to be given to increasing the volume of the on-site assembling of fully prefabricated residential buildings of the farmstead type. In 1985 the Ukrmezhkolkhozstroy is to erect 800,000 sq m of dwelling area of such houses, in its capacity as a subcontractor, while the UkSSR Ministry of Rural Construction will build an additional 200,000 sq m. The task is to assure their high architectural and construction quality.

On the basis of an assessment of the experience in and traditions of private rural home building, the UkSSR has developed and approved a list of types of rural residential buildings. This list was used as the basis for drafting 87 standard designs of such buildings for private home builders with allowance for the natural and climate conditions of various rayons of the republic and the possibilities for building with local materials and prefabricated components. The principal comprehensive series for industrialized rural construction are the [design] series "26" (Giprograzhdanpromstroy /State Institute for the Design and Planning of Civil and Industrial Construction/) and "94" (Ukrgorstroyproyekt /Ukrainian State Institute for Urban Design/), as well as the series "24" of buildings assembled from large lightweight-concrete components, developed by the Ukrniipgrazhdansel'stroy /Ukrainian State Institute for the Design and Planning of Civil and Rural Construction/.

Designs of farm premises for the upkeep of livestock and poultry also have been developed. The Ukrniipgrazhdansel'stroy has prepared for publication a catalog of standard designs of farmstead-type buildings consisting of structures varying in layout, appearance and materials used for their construction, designed for various natural and climate zones of the republic. But new types of private homes based on the use of effective lightweight materials and structural components serving to erect these homes rapidly and without using complex equipment, have yet to be explored.

Standard designs of rural public buildings also are being updated and improved. More than 50 designs have been completed, including those of new types of schools club-houses, shopping centers and other cultural and communal establishments.

The design and planning of the renewal of rural settlements in this republic are being constantly improved. The pertinent standards and techniques are being revised and seminars for the advanced training of designers and rayon architects are being organized.

The implementation of the comprehensive program for the socio-cultural development of the Ukrainian villages requires deep scientific substantiation, allowance for the specific features of various zones of the republic. Allowance must also be made for the directions in which the farms specialize, the development of agrarian-industrial production, the formation of cultural and consumer-service links between rural and urban population and the changes that result from scientific and technological progress in all branches of the national economy.

The successful accomplishment of the comprehensive program for the renewal of the republic's villages will contribute to providing optimal working, living and recreational conditions for the rural population.

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## HOUSING CONSTRUCTION

### UKRAINIAN HOUSING CONSTRUCTION REVIEWED

Moscow ZHILISHCHNOYE STROITEL'STVO in Russian No 8, Aug 82 (signed to press 28 Jul 82)  
pp 3-7

[Article by G. K. Zlobin, Chairman of UkSSR Gosstroy: "Housing Construction in the Ukraine" under the rubric "Toward the 60th Anniversary of the USSR"]

[Text] Soviet Ukraine, a republic of grain growers, miners, metallurgists, builders and scientists, is, together with all the other peoples of the USSR, confidently building the communist future.

Comrade L. I. Brezhnev declared: "It can be stated without exaggeration that the Ukrainian nation could properly straighten its shoulders and find room for its industriousness and talents only in the community of the Soviet republics, on uniting with the other republics and thus multiplying tenfold its own strength."

Unflagging attention is being paid in the Ukrainian SSR to problems of mass housing construction. Under Soviet rule housing with an aggregate dwelling area of 668 million sq m has been built. New cities and populated areas have arisen on the map of the Ukraine, including Novaya Kakhovka, Severodonetsk, Svetlovodsk, Novovolynsk, Pervomaysk, Ukrainsk and many others. Kiev, Khar'kov, Donetsk, Dnepropetrovsk, Odessa, Lvov, Zaporozh'ye and many other cities have considerably expanded their boundaries and turned into major industrial and cultural centers.

The development of mass housing construction in the republic began in 1923, and during 1930-1932 comprehensive urban build-up was commenced. During the prewar five-year plan periods the number of cities reached 255 (compared with 103 prior to 1917) and about 460 urban-type settlements were built. On the eve of the Great Patriotic War the housing stock totaled 97 million sq m. During the war the republic's housing stock was severely devastated. More than 1,714 cities and settlements and over 20,000 villages were totally or partially destroyed. Through the efforts of the entire Soviet nation Ukraine arose from the ashes and ruins bequeathed by the Fascist invasion. The fraternal republics dispatched here more than 600,000 skilled blue- and white-collar workers. Trains bearing building materials, lumber, machine tools and equipment arrived. Owing to the fraternal assistance of all the Union republics, during the first two postwar five-year plan periods (1946-1955) 88.1 million sq m of housing was built and restored in the Ukraine.

The best results in housing construction were attained during the 10th Five-Year Plan period in this republic. It was then that housing with an aggregate dwelling area of 91.4 million sq m was built in cities and villages. The technical level of housing and public construction rose markedly. In 1981 the share of large-panel and modular-unit residential buildings was 61.2 percent, of which about 65 percent was built on the basis of standard new-series designs. Sixty house-building enterprises operate in the republic. The variety of designs is being broadened as well. The series designs have currently been expanded to accommodate sections of varying configuration, buildings for small families, dormitories, and preschools. For the "94" series alone 37 designs have been drafted. The level of standardization of the design of residential and public construction has reached 96 percent.

Standard designs of a new generation of residential buildings are widely introduced in the republic. Of special interest are the designs of 16-story apartment buildings for Kiev, which have supplanted the BPS-6 series. Increasing the spacing from 3.2 to 3.6 m has made it possible to improve the architectural-layout and design solutions and increase the comfort level of the apartments.

In housing and public construction broad use is being made of new building materials, including coilless roofing materials based on bitumen-emulsion mastics and gypsum-cardboard sheeting of improved quality. The work on a comprehensive revision of designs with the object of improving the heat insulation of buildings is ending. Many of the republic's cities methods of comprehensive continuous-flow construction of residential and public buildings based on continuous planning are being introduced.

Scientists and designers pay considerable attention to problems of developing effective design solutions for the erection and experimental verification of buildings adapted to complex geological conditions. Specialists at research and design institutes work on one of the most complex problems of increasing the comfortability of housing--noise control. In Kiev was completed the construction of an experimental noiseproof building whose architectural plan is based on the idea of utilizing the acoustical shadow: the rooms are protected against noise by a hallway and auxiliary premises. Similar experiments are under way in Khar'kov, Dnepropetrovsk and other cities.

In recent years the planning and build-up of the republic's cities have markedly improved. Considerable attention is paid to adapting new build-up areas to their natural surroundings with allowance for local architecture and primarily for local urban-planning traditions and historical-architectural legacy as well as for the development of the housing-construction facilities. All this on the whole influences the architectural distinctiveness of new build-up.

The republic's cities include residential areas distinguished by a high level of urban-planning solutions. They include for example, the showcase "Pobeda" housing project in Dnepropetrovsk. It was built with high indicators of the quality of construction and installation operations and comprehensiveness of build-up. The construction of housing was accompanied by the construction of trade and public feeding enterprises, preschools, medical establishments, libraries and cinemas. A large part of this project is situated on manmade land covering former river-bank shallows, which served not only to solve the problem of preserving valuable farmland but also to exploit favorable opportunities provided by nature itself--create a zone of recreational greenery along the river.

The "Sriblyastnyy" housing project has blended felicitously with the architectural face of ancient Lvov. Its designers succeeded in forming an autonomous architectural ensemble on the basis of standard designs of five- and nine-story apartment buildings. The designers were awarded the State Prize of the Ukrainian SSR imeni T. G. Shevchenko.

A shining example of the creative approach of architects to the solution of complex urban-planning problems in mining areas is the build-up of Donetsk, which has within a short period of time grown from a mining settlement into a modern socialist city.

The experience gained in building the best urban housing developments of the Ukraine has found broad application in the design and construction of housing projects in Kiev. The residential areas of that city are characterized by a high density of build-up, a well-conceived system of shopping and service facilities, a careful attitude toward natural environment and the distinctiveness of their architectural solutions.

Unflagging work is being done in the republic to improve the quality of the build-up of housing projects. However, an expansion of the variety of the modular units and sections fabricated is impeded by a number of objective difficulties. Primarily, there is the marked increase in the complexity of the production technology of the components of large-panel housing construction when organizing the fabrication of new modular units and sections. The number of product grades is increasing and the mold pool is growing, which affects the rise in labor productivity.

This situation has necessitated exploring new paths of standard-design work. The development of improved standard designs of the existing series has been organized on the basis of new progressive designing techniques in the republic. The new techniques are based on the use of a limited variety of larger modular units serving to shape residential buildings of varying number of floors and configuration. Thanks to this, the urban-building possibilities of industrialized building construction are being considerably broadened, while at the same time its production technologies are becoming streamlined owing to the curtailment of the variety of products fabricated.

At present this method has been used to develop an improved series-480 design for Donetsk. The technological lines of the "Stroydetal'" [Structural Components] Combine will fabricate standard modular elements instead of modular sections, thus reducing the number of product grades manufactured to 220 from 400. Similar work is under way for Dnepropetrovsk, Sevastopol' and Khar'kov. This year design work on improving the K-134 series for the Kiev DSK-4 on the basis of the addressed design system is being completed. The introduction of that system will make it possible to verify the effectiveness of the new method. The first building in this improved series is to be erected in 1983.

The republic Gosstroy and the Union of Ukrainian Architects devote constant attention to improving the quality of architectural and design solutions, perfecting the professional mastery of designers and improving the quality of construction. To this end, annual contests are held for best designs in urban planning and architecture as well as for best buildings and complexes. For example, last year 112 designs of urban planning, public buildings, residential buildings, rural architecture, industrial architecture, landscaping and restoration were submitted to a contest for best designs.

A number of the submitted designs is distinguished by their novelty, originality of architectural-layout solutions and high-technical-economic indicators. They include a detailed master plan for the eastern residential district of Zhdanov, the design of an apartment building with a built-in kindergarten-nursery in Khmel'nitskiy, a series of standard designs of single-family homes integrated with farm structures for private home builders in the western region of the republic.



It is worth noting that special importance is attached to problems of transforming and building up the villages of the Ukraine. The development of a new type of rural home, an improved network of cultural and consumer services as well as of utility mains for rural settlements, is an important part of the socio-economic measures being taken in this republic to transform socialist agriculture. Last year the UkrNIIPgrazhdansel'stroy [Ukrainian Scientific Research and Design Institute of Civic and Rural Construction] disseminated its experience in the design and planning and construction of experimental model settlements in the Ukrainian SSR. This project will serve to draft practical recommendations for determining the most rational techniques of the planning, build-up and refinement of villages and progressive types of residential and public buildings.

A distinguishing feature of these experimental model settlements is their integrated planning. the construction of production facilities, residential buildings and public buildings is accompanied by the installation of greenery, recreational facilities and utility systems.

These tasks have been most fully implemented in the planning and build-up of the settlements of Kodaki, Tsybli and Kalita in Kiev Oblast; Yelizavetovka in Donetsk Oblast; Kamenka in Nikolayev Oblast; Shlyakhovaya in Vinnitsa Oblast; and Podvirnoye in Chernovtsy Oblast--these settlements were awarded prizes of the USSR Council of Ministers. Analysis of social-economic effectiveness shows that such integrated planning of settlements results in a marked improvement of socio-demographic and production indicators. The advanced experience gained in building these experimental model settlements is widely disseminated as confirmed by the results of the 1981 All-Union Contest, whose jury conferred awards on 53 rural settlements in the Ukraine.

Analysis of the experience in the construction of 68 different types of rural homes (single-family homes, interlocked buildings, sectional buildings of varying size and number of floors) made it possible to identify the most progressive types and rational layout solutions for long-range construction.

During the 10th Five-year Plan period experiments were conducted in the build-up of villages with sectional multi-family buildings provided with highly effective utilities. But an overwhelming majority of the rural population prefers houses of the farmstead type, traditional in rural areas, which make it possible to maximize the advantages of private land plot farming. It is worth noting that this type of housing accounts for 96 percent of the entire housing stock in the republic's villages. At the present stage of development of housing construction in the countryside, as conditioned by the decisions of the May (1982) Plenum of the CPSU Central Committee, attention is focused on designing farmstead types of residential buildings. Currently, 75 standard designs of single- and two-family farmsteads with from two to six rooms have already been developed. Their planning and layout solutions allow for the techniques currently widespread in private home building within various zones of the republic. In addition to these house designs, standard designs of farm structures have been developed.

Along with developing new planning and layout solutions, architects are working to design an architectural-artistic image of the rural home that would meet present-day esthetic requirements on allowing for the progressive features of folk architecture. The work on the new generation of standard designs of houses is continuing, but even now the inhabitants of our villages are offered a broad gamut of designs allowing for the possibilities of the rural housing construction base and the special features of the plans and decorative finishing of buildings that are traditional in various oblasts of our republic. This serves to develop interesting and varied architectural build-up and meet the present-day needs of socio-cultural construction in the countryside.



During the 11th Five-Year Plan period the republic builders face great and responsible tasks. The share of large-panel, modular-unit, and panel-unit house-building in the overall volume of housing construction is to be raised to 65 percent in 1985. To this end, a broad program for the further development and improvement of the material-technical base of construction and expansion of output and improvement in the quality of building materials, structural elements and products has been developed and is being implemented in the republic. A provision has been made for the activation of new large-panel housing construction enterprises and the expansion and modernization of about one-half of the existing enterprises of this kind for fabricating buildings according to standard designs of new series, and measures are intended to improve the utilization of the production capacities of construction-industry enterprises.

R&D work on new structural and planning solutions is under way, and apartments are to be provided with new types of plumbing and kitchen fixtures. The problems of improving the facades of buildings and the architectural-artistic qualities of built-up areas on the basis of the use of new durable and highly artistic finishing materials are being solved. Unflagging attention is devoted to increasing the offsite readiness of the prefabricated components of large-panel buildings.

For the 11th Five-Year Plan period, a program for the mass introduction of the results of scientific research into housing construction is being planned. Plans also exist for building about 1 million sq m of the aggregate dwelling area of high-rise buildings with improved structural elements on subsidence soils and mining areas and expanding the volume of the construction of nine-story buildings with walls of large-sized silicate blocks.

By 1985 the current pool of finishing machinery, power tools, and other means of small-scale mechanization at construction organizations should be increased by a factor of 1.5-2 and the brigades of plasterers, painters, roofers, stone-masons, concrete workers and installers should be fully supplied with complete sets of technological means of mechanization, implements and tools.

Much work is being done in the field of improving the organization of the construction process. The method of continuous-flow residential and public construction in the cities, based on comprehensive continuous planning, will be used to build 18 million sq m of dwelling area over 5 years.

The DSK and construction organizations of the republic have the task of completely converting, during the current five-year plan period, to the /combined-skills/ brigade system all the brigades, sectors and teams operating in housing construction, and developing new forms of the organization of labor.

The initiator of the continuous-flow method of housing construction in accordance with annual brigade plans was the combined-skills brigade of installers directed by I. D. Ganchuk, Hero of Socialist Labor, Honored Builder of the Ukrainian SSR, and Winner of the USSR State Prize, at the Grazhdanstroy Construction Administration of the Nikopol'stroy [Nikopol' Construction] Trust of the UkSSR Mintyazhstroy [Ministry of Heavy and Transport Machine Building]. The effectiveness of performance of I. D. Ganchuk's brigade is still further improved by its use of standard sets of progressive tools and installation gear, broad application of packaging and containerization, and the installation of structural components directly off the means of transport. The introduction of progressive forms and methods of the organization

of labor as well as a creative approach toward work enabled I. D. Ganchuk's brigade to become the first in the republic to attain an annual output of more than 100,000 rubles per worker during the 10th Five-Year Plan period.

The combined-skills brigade of Hero of Socialist Labor V. S. Plakhotin at the SU-1 [Construction Administration No 1] of the Khar'kov Order of "Sign of Honor" DSK-1 of the UkSSR Minpromstroy [Ministry of Industrial Construction] came up with the initiative for converting to a new organization of operations--the establishment of an end-production brigade based on the scheme "brigade-conveyor-flow." V. S. Plakhotin's brigade had in 1981 attained an output of 104,000 rubles per installer, and the residential buildings it releases for occupancy are invariably graded as either "Good" or "Superior."

An example of creative approach to the development of socialist competition is provided by the combined-skills brigade of N. G. Dashko, Hero of Socialist Labor, Honored Builder of the Ukrainian SSR, and deputy to the USSR Supreme Soviet, at the SMU-6 [Construction and Installation Administration No 6] of the Khersonpromstroy Combine, which, on the basis of the brigade method of organization and stimulation and the Vinnitsa method of brigade planning, supply and accounting, reached high indicators in the construction of residential buildings in Kherson. N. G. Dashko's brigade is the initiator of paired socialist competition, which consists in that an experienced and leading collective acts as a patron toward a lagging or less experienced collective; together with that other brigade, acting as a pair, it competes with other collectives. Practice shows that this form of competition promotes improvements in production performance and strengthens practical contacts among brigades.

Builders, designers and researchers in the republic are celebrating with new feats of labor the glorious jubilee 60th anniversary of the Union of Soviet Socialist Republics and fruitfully working to translate into reality the historic decisions of the 26th CPSU Congress.

#### PHOTO CAPTIONS

1. p 3. The Obolon' Housing Project in Kiev (partial view).
2. p 4. Variants of buildings in the improved K-134 (design) series. Kiev [top].
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6. p 6. Sectional garden apartments in the village of Vuzlov, Radekhovskiy Rayon, Lvov Oblast [top left].
7. p 6. Private homes in the village of Vuzlov [top right].
8. p 6. Residential build-up at the "Voskhod" Sovkhoz, Crimean Oblast.

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## HOUSING CONSTRUCTION

### BELORUSSIAN SSR: HOUSING DEVELOPMENT REVIEWED

Moscow ZHILISHCHNOYE STROITEL'STVO in Russian No 7, Jul 82 (signed to press 30 Jun 82) pp 2-7

/Article by V. G. Yevtukh, Chairman, BSSR Gosstroy: "Development of Housing Construction in BSSR" under the rubric "On the 60th Anniversary of the USSR"/

[Text] Soviet Belorussia is a land of modern cities, industrial and cultural centers and well-built villages and settlements. Today it is difficult to imagine that this republic used to be one of the most backward borderlands of the Russian Empire, where even the urban population lived chiefly in single-story wooden buildings lacking elementary amenities. As for the level of the architecture of small provincial towns and rural settlements, it was not even worth mentioning. It was only thanks to the implementation of Lenin's nationality policy that the vigorous development of the republic's economy and culture could be assured and a most important social problem--the provision of well-built housing to the population--could be solved.

The first taller apartment building, the "Dom-kommuna," containing two- and three-room apartments, was built in 1932-1934 in Gomel'. Its ground floor contained stores, a nursery, a library. Similar four- and five-story apartment buildings were erected in Minsk, Orsha, Vitebsk and other cities of the republic. A standard type of apartment building was gradually developed. Further improvements in the architecture of apartment buildings related to the construction, during 1938-1941, of major housing projects in Minsk and Mogilev. Of the greatest interest are the apartment buildings on Pobeda [Victory] Square in Minsk, based on the design of the architect G. Stoller, who had largely succeeded in designing a modern apartment building. These buildings, which exist to this very day, are of interest considering that they were essentially the first step in the formation of prefabricated housing in Belorussia.

Major capital outlays in the national economy and the development of industry during the 2nd and 3rd Five-Year Plan periods (1933-1941) resulted in a rapid urban growth in the republic, whose urban population during that period increased by a factor of 2.5. The communal housing stock in the republic's cities had also increased. In 1940 it amounted to 4,400,000 sq m compared with 1,153,000 sq m in 1926. Altogether, during the prewar five-year plan periods (1928-1941) 1.4 million sq m of dwelling area was built in Belorussia--more by a factor of 3.8 than what had been built between 1919 and 1928.

The creative labor of the republic's working people was disrupted in 1941 by the treacherous invasion of our country by Fascist Germany. The war caused incalculable losses: 209 cities and 9,200 settlements were devastated and burned and every fourth inhabitant of the republic had died. More than three-fourths of the housing stock was destroyed.

From the very first days of its liberation the republic was transformed into one giant construction site. The problems of rebuilding cities and villages involved their radical renovation and modernization with allowance for the experience and achievements of Soviet town planning. A tremendous volume of work to rebuild the cities of Belorussia was carried out within an unprecedentedly short period--during the first two postwar five-year plan periods. New architectural ensembles of squares and thoroughfares, housing projects and entire city quarters arose in the cities of Belorussia. Their formation included not only public edifices but also and to a large extent residential buildings composing the basic "fabric" of urban build-up.

The construction of taller residential buildings lining Lenin Prospect, the major thoroughfare of the capital of Belorussia, represented a major accomplishment of the first postwar decade. For this accomplishment, the team of architects responsible was awarded in 1968 the BSSR State Prize, which they also merited for designing the Lenin and K. Marx streets and the train-station square in Minsk, the Lenin Prospect in Gomel', Kirov Street in Vitebsk and First of May Street in Mogilev. The taller residential buildings were as a rule based on individual designs blending each building with the architectural whole of an urban complex. They were designed on the basis of standard sections assuring the necessary standardization and unification of construction products. Major housing projects arose on the outskirts of cities near new industrial enterprises. Standard designs of two-, three-, four- and five-story apartment buildings based on republic and all-Union series were broadly used. The use of standard designs of residential buildings and sections promoted the successful fulfillment of the grandiose program for housing construction during the postwar five-year plan periods.

Beginning in 1956 the republic's construction industry mastered the mass construction of large-panel residential buildings. Industrialized construction techniques served to markedly expand the volume of housing construction in the cities. It was then that large housing developments based on the mikrorayon [housing project] system were built in the republic's cities: In Minsk, on Volgograd, Orel, Opanskiy, Chkalov and Khar'kov streets and in the Zelenyy Lug rayon as well as along Partisan Prospect; in Gomel' the Festival Settlement; in Mogilev, the Mogilev-2 Mikrorayon; in Grodno, on Gor'kiy Street; and in Vitebsk, along the Smolensk Highway, in addition to new housing projects in Novopolotsk, Soligorsk, and Svetlogorsk. The construction of the first housing projects represented a major school for mastering the technology and organization of industrialized mass housing construction and new architectural planning techniques. This was accompanied by work to improve the layout solutions of mass-built houses and apartments. As early as in 1966 the large-panel housing construction enterprises in the republic were converted to the fabrication of buildings with improved apartment layouts. As a result, in 1967 Belorussia converted to the construction of improved types of dwellings.

Modular housing construction was greatly developed in the republic. As early as in the beginning of the 1960s, buildings began to be experimentally assembled from



room modules. These experiments served to develop a series of building designs used to organize the production of room units at the USSR's first room-module housing construction plant in Minsk with a capacity of 100,000 sq m of dwelling area a year.

The improvements in industrialized housing construction in the cities of Belorussia were accompanied by searches for new solutions to the architectural planning of areas of mass housing construction. Examples of the architectural planning of large architecturally distinctive housing projects are the following projects in Minsk: Vostok-1, Zelenyy-Lug-5 and Serebraynka, as well as sections of Vera Khoruzhey and M. Gor'kiy streets, Pushkin Prospect and Pritytskiy and Serov streets. Mention should be made of the housing project along Moscow Prospect and in the "South" Quarter in Vitebsk; the projects "Forty" and "Pereselka-III" in Grodno; the housing developments along Sovetskaya Street and No 11 in the valley of the Sozh River in Gomel'; along Pushkin Prospect and the "Mir" Project in Mogilev; the Vostochnyy Housing Development in Brest; the complex of 9-14 story buildings with trade and consumer service enterprises on the central square of Soligorsk; and the build-up of Novopolotsk.

A new stage in the development of housing construction in Belorussia began upon the conversion in the 1970s to the section-unit method of designing housing with a higher level of apartment amenities, serving to broaden the diversity of urban build-up and develop interesting and decorative layouts. The introduction of this method on the basis of buildings in the M-335-9, M-464-9 and M-111-90 series was accomplished by developing section units of varying layout with different variants of architectural treatment of staircase-elevator units, entrances, loge and balcony systems, top parts of buildings, surface finishes, and the finish of wall panels. The development of the section-unit method resulted in the organization of the production of autonomous section units and interlocking elements which serve to design buildings of varying extent and configuration in a single master plan to reorient and move sections and to diversify heights.

The current stage in the development of large-panel housing construction in the BSSR is characterized by the transition to a new system for the design and construction of large-panel residential buildings on the basis of a unified nomenclature of products in the republic Catalog of Unified Standard Designs for Housing and Public Construction. The products in the catalog were selected and approved so as to match a number of layout solutions for apartment room units and standardized design solutions. The development of series of residential buildings on this basis serves to design architecturally varied residential buildings from components that have been considerably (up to 75 percent) standardized to fit all the series. Currently this system has been used to develop and introduce at the Bobruysk DSK [Housing Construction Combining] a series of five- and nine-story section units of residential buildings as well as to develop a base series which is to be introduced during the present five-year plan period at the Grodno and Brest DSK's. The series includes 5-, 9- and 12-story residential buildings and section units along with buildings for small families and hostels. This series consists of various types of apartments and room units of hostels, accommodating varying numbers of dwellers. This serves to combine as needed various types of apartments in a newly planned housing project.

The steady rise in the level of social and economic development provides realistic premises for further improvements in mass housing construction. As a result, R&D work is currently under way in this republic to develop the type of dwelling most

suitable for the next stage of mass construction, in which focus will be placed on developing improved types of buildings with greater amenities as well as on achieving a more distinctive residential architectural style.

Measures to conserve all kinds of resources are being taken in this republic. This also is a goal of the work to revise the standard and re-used building designs developed and applied in this republic. Uneconomical designs have been discarded. The catalog of reinforced concrete products fabricated by Belorussian enterprises has been revised. This makes it possible to reduce steel consumption by an average of 4 kg per sq m of adjusted dwelling area, as well as to reduce correspondingly cement consumption by 5 kg, and so to save about 12,000 tons of steel and nearly 15,000 tons of cement for the republic as a whole. The introduction of the revised designs will reduce the consumption of fuel by 3,800 adjusted tons annually.

The great contribution made by designers and builders to refining large-panel housing construction in Minsk and making it more economical was acknowledged by the award, in 1978, of the Prize of the USSR Council of Ministers.

A new form of industrialized construction in the republic is the erection of buildings from poured-on-the-spot concrete structural components. The first such building, of agloporitoconcrete 16 stories high, was built in 1972 within the Vostok-2 Housing Project in Minsk according to a design of the TsNIIEPzhilishcha [Central Scientific Research and Planning Institute of Standard and Experimental Planning of Housing]. On the basis of that experiment a group of high-rise (16-, 18-, and 20-story) buildings was erected in the Vostok-1 Housing Project. The creative collaboration between the designer teams of the TsNIIEPzhilishcha and the Minskproyekt [Minsk Design and Planning Bureau] and the builders made it possible to solve problems of the technology of the erection of such buildings and the variation of their architectural and artistic solutions.

All this has served to commence the design and construction of new high-rise buildings from poured-on-the-spot concrete in Minsk as well as in Brest, Mogilev, Grodno and Bobruysk. The construction of buildings of this type with their unique architectural style enriches the silhouettes of the republic's cities.

In the last 15 years buildings with a dwelling area aggregating more than 4 million sq m have been released for occupancy each year. During the 10th Five-Year Plan period alone the total dwelling area released for occupancy amounted to 20.9 million sq m, which made it possible to improve housing conditions for about 2 million people.

Recently the republic has scored major accomplishments in rural housing and public construction. During the 1966-1980 period alone rural housing construction totaled 21,400,000 sq m of dwelling area, or more than one-fourth of all rural housing stock in the republic. The share of housing built with state capital outlays and the collective funds of the kolkhozes has especially increased. During that period, more than 1,580 elementary schools, preschools for an enrollment of more than 84,500, clubs and houses of culture accommodating 148,000 visitors and hospitals with a total of 4,790 beds also were built.

That period is characterized not only by the quantitative growth of the housing stock and public buildings in the countryside. Qualitative changes also took place in the design and construction of housing and cultural and communal buildings.

The work to transform the architectural face of the countryside required radical changes in methods of rural construction such as, primarily, the development and consolidation of the rural construction industry and its production and material-technical facilities, the increase in the output of building materials and a sweeping industrialization of construction.

The practice of recent years and the experience in experimental-showcase construction in the republic showed that the basic type of housing in the countryside should be buildings of the farmstead type with livestock premises and associated landplots for private farming, which most rationally combine the specific features of rural life with the amenities of urban apartments. Single- and two-family and garden-apartment buildings of the farmstead type will largely account for the appearance of our rural settlements during the 11th Five-Year Plan period.

Operating trials were passed by various types of residential buildings and planning and layout solutions. This served to develop rational layout variants of apartments adapted to the social and demographic composition of the rural population, the special features of local ways of life and rural life and the conduct of private land-plot farming.

Currently large-panel residential buildings, buildings of silica concretes, buildings of brick and gas-silica suspension panels, modular room-unit buildings, and buildings with walls made of local materials are erected on series-basis in this republic. This is due to the existing and planned development of construction industry facilities. It is worth noting that, beginning in 1976, rural housing has been built according to new standard designs meeting up-to-date requirements.

The series include various types of residential buildings adapted to the specific features of rural life and the conduct of private land-plot farming: farmstead-type--single- and two-family single and two-story houses; two-story garden apartment buildings of the interlocked kind containing three, four, five and six apartments each; two-story buildings of two to four apartments each, with separate apartment entrances; and also, in smaller quantities, sectional two- and three-story buildings and section units, as well as single-section four-story buildings for small families and singles.

In addition to the section-unit method of housing design, which also is widely used in rural construction, the housing designs developed in recent years provide for the possibility of interlocking discrete buildings. Thus, e.g. single-family houses can be interlocked into two-, three-, four-, five- and six-apartment structures with separate apartment entrances, depending on the adopted architectural-layout solutions for the build-up of settlements. This makes it possible to diversify the number of apartments in residential buildings as well as the integral architectural layout while using the same design solution and practically on using the same structural components and elements.

The work to transform the Belorussian countryside is organized in a planned and comprehensive manner, on the basis of long-range programs for the development of rural settlements and in accordance with planning and build-up designs.

All this has made it possible to markedly improve the architectural face of the villages and rural settlements in the republic and elevate the level of their amenities. This is graphically demonstrated by the awarding of the USSR State Prize for Architecture to the settlement of Vertelishki in the "Progress" Kolkhoz, and the Prize of the USSR Council of Ministers to the settlements of Malech, at the Sovkhoz imeni 60th Anniversary of the Belorussian CP, Brest Oblast, and Oktyabr'skiy, at the Selyuty Sovkhoz, Vitebsk Oblast. The all-Union contests for the best architecture and amenities of rural settlements resulted in the conferral of high awards of the USSR VDNKh [All-Union Exposition of Achievements of the National Economy] to more than 100 settlements. Thirteen of the transformed settlements in this republic were acknowledged among the best in the country and awarded Certificates of Commendation. They include in particular the settlement of Myshkovichi, "Rassvet" Kolkhoz imeni K. P. Orlovskiy in Mogilev Oblast, and the settlement of Sorochi, "Chyrvonaya Zmena" Kolkhoz in Minsk Oblast.

Even more impressive is the program for housing construction during the 11th Five-Year Plan period, during which housing with a dwelling area exceeding 21 million sq m is to be built in this republic. This construction will have to be performed at a qualitatively new level upon solving various complex problems of urban planning, architecture, increase in the effectiveness of the capital outlays allotted for housing construction, and extensive conservation of material, fuel-energy and other types of resources.

A number of measures will be taken to develop the material-technical facilities of industrialized housing construction and improve the utilization of existing capacities. Plans exist to increase the coefficient of utilization of these capacities to 0.9. The share of prefabricated housing construction in the total volume of housing built will rise from 68.1 percent in 1981 to 77 percent in 1985.

The volume of housing construction based on designs with improved architectural planning and layout solutions will markedly increase. The section-unit design method, employing a unified base series developed on the basis of the republic Catalog of Unified Standard Structural Components and Products, will be further expanded, thus making it possible to diversify the architectural build-up of both town and country.

During the current Five-Year Plan period special attention will be paid to private rural housing construction, which will account for a significant share of new construction.

To determine the optimal techniques of private home build-up and conduct operating trials of various related utility system, model block-long rows of private homes will be erected during the current five-year plan period in the neighborhood of a central farmstead in every rayon of the republic. A number of new designs for the construction of private homes has already been developed with allowance for the present-day living and recreational needs of the rural population and the specific features of private land-plot farming. In addition to the building of private homes with local materials, plans exist to convert such building to an industrialized basis with use of prefabricated keramzit-concrete and other lightweight structural components.



Architectural and layout solutions for rural dwellings have been geared to improving the functional interrelationship of premises. A provision has been made for the installation of dryer cabinets and a larger number of storage and subsidiary premises (fodder-preparation room, laundry room, etc.). In many designs kitchen area has been increased to 11.5 sq m. All residential buildings are designed to include ventilated basements for the storage of farm produce. The designs of homes of the farmstead type provide for a divided layout with a residential part and a part containing farm premises, and correspondingly with two separate entrances: a formal entrance leading into the parlor and hallway and an entrance to farm premises.

New qualitative changes will take place in the build-up of the civic centers of settlements. A major role in determining the optimal variety and types of public buildings in the settlement will be played by the experience gained in building experimental model farms in the republic, with the erection of cultural and consumer service facilities being based on the principle of the integration of various services in a single building and the interlocking of buildings into a single complex serving to enlarge them, elevate the architectural and artistic level of the build-up and markedly reduce the expenditures on the installation of utility systems and decoration.

The erection of public buildings in the countryside is carried out in accordance with rayon master plans and the developed branch plans. Thus, schools in the countryside are built in accordance with the long-range plan for the development and geographical distribution of schools by the year 2000, which specifies the types of and projected size of enrollment in school buildings, boarding schools, and residential buildings for teachers. Similar plans exist as regards the geographical distribution of other cultural-communal facilities.

To improve the living conditions of the inhabitants of smaller villages in the republic, the 11th Five-Year Plan envisages the establishment of an extensive network of cultural-communal services for the population through the adaptation of the newly released housing stock, the construction of portable buildings and the use of mobile means. Plans exist to develop the areas surrounding residential and public buildings, repair these buildings and construct access roads.

For the coming years, designs of cultural and communal buildings will be developed with allowance for the establishment of integrated civic centers in settlements, a rational integration of services and interlocking of buildings, diversification of building facades, and maximization of flexibility in design layouts.

The experimental construction of new housing will be continued during the current five-year period. This concerns the operating trials and elaboration of a large number of architectural-layout and design solutions resulting from the scientific research performed during the 10th Five-Year Plan period. A special role is assigned to the verification of technical solutions as regards the conservation of manpower, material and fuel-energy resources, increase in heat insulating qualities of residential wall panels, and the recovery of waste heat for heating purposes. These solutions will be implemented during the construction of a number of residential buildings in Minsk, Gomel', Mogilev and the countryside.

In the 11th Five-Year Plan period special attention will be devoted to integrating the build-up of cities and other inhabited areas. Only integrated housing complexes that include both dwellings and all the public buildings envisaged in the norms--educational, public health, consumer service, shopping and other facilities--should be released for occupancy.

A factor improving the living conditions of the population and contributing to a better solution of the problem of public transit is siting the places of work and dwelling of the working people close to each other. An effective means of accomplishing this is the development of industrial-residential complexes. By way of an example, consider the Severnyy Industrial-Residential Complex in Grodno with its optimally integrated construction of industrial enterprises, residential areas and cultural, communal and consumer-service facilities. It places within walking distance both sites of employment and consumer-service, public health and sports facilities, providing optimal conditions for the work, life and recreation of working people.

It is also planned to incorporate more actively in residential areas those industrial enterprises which do not require separation by broad zones of sanitary protection. This may be exemplified by the Ya. Kolas Square in Minsk, the 8 March Square in Gomel' and a large number of others.

It is expected that the restoration of housing of major historical and architectural importance in the cities and settlements of Belorussia will be intensified. At present a comprehensive program for such work during the 11th Five-Year Plan period is being drafted. Urban master plans will provide more broadly for the establishment of streets and quays confined to pedestrian traffic and representing major shopping areas. This concerns primarily the cities with historic architecture such as Grodno, Polotsk, Nesvizh and others.

Measures are planned to expedite the incorporation of the achievements of progressive science, technology and advanced knowhow in the designs, to use effective materials, products and structural components, and to assure on this basis a broad conservation of production resources. Thus for example, [reinforced-concrete] components not requiring prior on-site placement in molds, and primarily floor slabs, will be widely used in housing and public construction, thus reducing steel consumption by 2.2 kg per sq m. Plans exist to broaden the introduction of structural components fabricated from dense and cellular silica concrete and thus to reduce cement consumption by 6,500 tons per 100,000 sq m of dwelling area. Designers will incorporate in their designs prefabricated partitions of gypsum-cardboard sheeting which save 25,000 man-days in manpower expenditures per 100,000 sq m of such partitions while at the same time reducing their weight by a factor of 7-10. This also concerns an increased use of bathrooms, die-cast fittings, prestressed foundation piles without cross-reinforcement, modular elevator cages, and other progressive solutions. All this will serve to reduce the estimated cost per sq m of dwelling area by more than 6.5 rubles and achieve considerable savings of material, heat, energy and manpower resources. The implementation of the intended measures to develop and improve housing construction in the republic will contribute to the solution of a most important social task outlined by the 26th CPSU Congress--the satisfaction of the popular demand for well-built housing.

#### PHOTO CAPTIONS

1. p 2. 16-, 18- and 20-story apartment buildings of cast-in-place reinforced concrete, "Vostok-1" housing project in Minsk. Designers: the architects A. Belokon', G. Sysoyev, N. Gracheva and I. Popova and the engineers A. Lur'ye, N. Tyushko and V. Perederiy.
2. p 3. Partial view of "Zelenyy Lug" housing project in Minsk. Designers: the architects E. Levina, A. Volk, S. Bogin and I. Sitnikova and the engineers N. Guleva, T. Leyko, Yu. Rushev, L. Chernomortseva and A. Baranovskiy.
3. p 3. Apartment buildings on Pritytskiy Street in Minsk. Designers: the architects A. Naumov, G. Sysoyev, P. Zhurov and A. Shishakin and the engineers V. Perederiy, V. Sitnikov and T. Kuz'menko.
4. p 4. Apartment buildings along Gor'kiy Street in Grodno. Designers: the architects V. Davydenko, I. Maznichenko and engineer G. Denisov.
5. p 4. Single-family two room home. "Communist Manifesto" Kolkhoz, Mogilev Oblast. Designers: architect N. Dolgykh and engineer T. Tartakovskaya.
6. p 4. Interlocked six-apartment two-story buildings. Myshkovichi settlement, "Rassvet" Kolkhoz imeni K. . Orlovskiy, Mogilev Oblast. Designers: architect G. Zaborskiy and engineer L. Zhevnerov.
7. p 5. Apartment building with consumer-service facilities on First of May Street in Mogilev. Designers: the architects I. Frolov and G. Borokhov and engineer R. Oleksin.
8. p 5. Shopping center and hotel in Myshkovichi settlement, Kirovskiy Rayon, Mogilev Oblast. Designers: architect G. Zaborskiy and engineer A. Romanovskaya.
9. p 6. Buildings along Kirov Street in Vitebsk.

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## CONSTRUCTION MACHINERY AND EQUIPMENT

### INDUSTRY'S APPROACH TO ECONOMY OF ENERGY AND MATERIAL RESOURCES OUTLINED

Moscow STROITEL'NYYE I DOROZHNYYE MASHINY in Russian No 8, Aug 82 (signed to press 2 Aug 82) pp 1-3

[Article by Ye. V. Spiridonov, Deputy Minister of Construction, Road and Municipal Machine Building: "The Targeted Comprehensive Program for Conservation Within the Subsector and Its Role in Promoting the Conservation of Energy and material Resources"]

[Text] The main economic task of the subsector of construction, road and municipal machine building during the 11th Five-Year Plan period is the priority utilization of intensive factors of economic growth, an all-out increase in the effectiveness of the utilization of material, fuel, energy, manpower and other resources.

The tasks of the Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] as regards the conservation and rational utilization of material, fuel-energy, manpower and other resources during the 11th Five-Year Plan period are defined by the Main Directions of the Economic and Social Development of the USSR for the Years 1981-1985 and for the Period Until 1990 as well as by the resolution of the CPSU Central Committee and the USSR Council of Ministers "On Intensifying the Work to Conserve and Rationally Utilize Raw Material, Fuel-Energy and Other Material Resources."

The following measures are planned in order to solve the problem of conserving all types of resources in the subsector during 1981-1985:

--a 20-percent reduction in the consumption norm of ferrous rolled stock for production purposes, increasing the coefficient of the utilization of that stock to 0.79, and a reduction in the norms of consumption of other types of ferrous and nonferrous metals as well;

--an 8.9-percent reduction in the consumption of fuel and energy resources;

--the introduction of economical types of metal products with the object of reducing the metal-intensiveness of machinery and equipment and conserving metal;

--review and standardization of blueprints and other technical and design documents so as to tighten the specifications for, among other things, permissible stresses, safety margins of strength, test methods;



--an increase, by a factor of 1.5-2, of the operating life of the principal types of machinery and equipment prior to scheduled overhauls, as compared with the 1975 level;

--a broad introduction of scientific and technological achievements serving to streamline the utilization of material and fuel-energy resources;

--maximum utilization--in all the operations of preparatory, processing and other types of production--of progressive techniques and methods of shaping blanks and components on the basis of a broad application of resource-saving technologies and high-capacity equipment and tools;

--improvements in the system of performance-related bonuses for workers, foremen, technologists, designers and other engineers and technicians, granted for conserving particular types of material and other resources in excess of the established norms.

The implementation of these measures at every stage of the building of construction and road machinery is promoted by the **TARGETED COMPREHENSIVE SUBSECTOR CONSERVATION PROGRAM** [printed in boldface], which provides for the development and implementation of a set of practical steps intended to, first, reduce the designed metal-intensiveness of the currently built and newly designed machinery and equipment, and increase their reliability and operating durability; and, secondly, markedly reduce the waste and loss of metal products during their fabrication; and, thirdly, improve organizational forms and elevate the level of the planning and the system of standards and specifications of production so as to employ on a broad scale high-capacity technological equipment and progressive low-waste technological processes of the shaping of blanks and components.

The targeted comprehensive subsector conservation program consists of three sub-programs and encompasses the principal scientific-technical and production problems related to the further development and increased effectiveness of production and the quality of production in the subsector.

The program provides for the development of measures to streamline material norms and introduce a system of progressive norms and specifications in the subsector as regards the utilization and transportation of material-technical resources.

The implementation of the measures outlined in the conservation program will serve during the years 1981-1985, provided that volume of output is increased by a factor of 1.3, to save 450,000 tons of ferrous rolled stock, 230 tons of brass rolled stock, 300 tons of copper rolled stock, 1,100 tons of aluminum rolled stock, 13,400 tons of rolled pipe, 1,900 tons of drawn pipe; 1,496,000 linear meters of thinwalled seamless pipe; 27,850 tons of adjusted fuel, 388.1 million kwh of electrical energy, and 259,200 giga-calories of thermal energy.

It is expected that definite savings of metals and other materials will be achieved by expanding the application of plastics and other modern construction materials in the subsector. During the 11th Five-Year Plan period the subsector will use more than 10,000 tons of plastics and at least 320,000 tons of powder-metallurgical products.

The USSR Ministry of Ferrous Metallurgy has, jointly with the Minstroydormash, approved an inter-subsector plan for the development and expansion of the supply of progressive types of metal products to the subsector's enterprises during 1981-1985. The implementation of this plan will serve to save about 1 million tons of ferrous rolled stock and other types of metal products.

A major task of the subsector is to develop machinery with a sufficiently long operating period to operate equipment throughout its service life without requiring major overhauls. In 1980 this requirement was met by only 12 types of machinery, and by 1985 the number of such types should increase to 31, including all-purpose hydraulic and mechanical excavators, jib cranes of the self-propelled kind with hoisting capacity of up to 10 tons, tower cranes with hoisting capacities of 8, 10 and 25 tons, self-propelled static rollers, all-purpose fans and fire engines.

The savings to the national economy from prolonging the service life of equipment and primarily from precluding the need for major overhauls will total more than 70 million rubles, while at the same time saving the economy 45,000 tons of metal, a year.

The introduction of measures to reduce the unit metal-intensiveness of machinery and equipment will reduce that indicator by 6-7 percent while at the same time saving more than 90,000 tons of metal.

A major direction of raising the technological level of machinery, reducing its bulk and increasing its capacity is the conversion from mechanical to hydraulic drive. Thus, the weight of a power-drive excavator with a 2.5 cu m bucket, built by the "Plant imeni Komintern" Voronezh Association, is 94 tons, whereas the weight of its fluid-drive counterpart with a bucket of the same capacity is 56.2 tons; the weight of a power-drive excavator with a 1.25 cu m bucket is 41.5 tons, whereas the weight of its fluid-drive counterpart is 36 tons. In addition, the productivity of fluid-drive excavators is up to 30 percent higher.

The Kalinin Excavator Plant has developed in 1981 the new EO-3323 excavator with a 0.63 cu m bucket, whose productivity is 25 percent higher and weight 500 kg lower than that of the currently produced EO-3322B excavator. The EO-3323 excavator has passed state tests and the first lot of these excavators will be built in 1982.

The Program provides for conducting a broad variety of research, design and development projects intended to reduce the structural metal-intensiveness of machinery and equipment and increase their reliability and durability as well as to develop new economical rolled shapes. The implementation alone of the research, design and development projects envisaged in the SUBPROGRAM FOR SAVING METAL AND PROLONGING THE OPERATING LIFE AND REDUCING THE METAL-INTENSIVENESS OF THE PRINCIPAL TYPES OF MACHINERY AND EQUIPMENT OWING TO IMPROVEMENTS IN DESIGN [printed in boldface] would save 128,600 tons of ferrous and nonferrous metals as well as 63.3 million rubles.

For the subsector as a whole, the implementation of measures to improve the design of machinery and equipment and use /metal/ substitutes, metal products of improved quality and economical rolled shapes would save more than 350,000 tons of ferrous and nonferrous metals, including about 290,000 tons of ferrous rolled stock, more than 11,000 tons of steel pipe, more than 1,000 tons of ferrous rolled stock [as published], more than 32,000 tons of steel castings, about 28,000 tons of iron

castings, and 800 tons of nonferrous-alloy castings. These measures would save the national economy about 120 million rubles.

The second most important direction of the conservation of raw material, fuel-power, manpower and other resources is the implementation of the **SUBPROGRAM FOR THE CONSERVATION OF MATERIALS AND INCREASE IN COEFFICIENTS OF UTILIZATION THROUGH IMPROVEMENTS IN TECHNOLOGICAL PROCESSES AND INTRODUCTION OF LOW-WASTE TECHNOLOGIES.** (printed in boldface)

Substantial savings of material resources will be achieved by improving the existing—and developing and introducing new progressive—technologies of forming blanks and components so as to make them as close as possible in shape and dimensions to their finished counterparts. Such savings also will be achieved by improving the methods and techniques of cutting rolled sheets and sections, improving the physico-mechanical (strength) and operating qualities of the currently used metals and alloys and developing new metals and alloys, and replacing ferrous metals with high-strength aluminum alloys, composite-material products (including powder metals), and other materials.

The subprogram consists of five basic chapters specifying the complex whole of measures to markedly reduce the wastage and loss of metal products during their fabrication. These measures include the production of a number of components from rolled coils rather than from sheeting, with the organization of computer-controlled specialized cutting shops and sectors and comprehensive mechanization of production processes; the use of semi-hot drawing of hydraulic-cylinder sleeves as well as of extrusion in the fabrication of the shaping parts of dies; knurling of twin-flange wheels; supplanting the components fabricated from rolled stock with a low metal utilization coefficient (up to 0.5) by components fabricated with precision casting techniques; retooling of the casting and forging shops of the subsector; production of polystyrene-foam investment-pattern castings of high-strength iron in magnetic fields, vacuum-film molding and various others.

The implementation of this subprogram at the subsector's enterprises would save 237,500 tons of metal during the 11th Five-Year Plan period, owing to the reduction of wastage and loss of metal products. Of this total, the savings of ferrous rolled stock alone would amount to 167,000 tons; sized steel, 10,900 tons; pipe, 16,500 tons; ingot forgings, 5,500 tons; steel castings, 19,000 tons; and iron castings, 18,500 tons.

In addition, during the period planned, the marked decrease in the volume of metal chips during machining will result in reducing the labor-intensiveness of production by 16.3 million norm-hours and saving 39.1 million kwh as well as more than 2 million rubles of cutting tools. More than 3,800 metal-cutting machine tools will be thus relieved for other operations, in equivalent terms. While the cost of this subprogram will be 104.04 million rubles, it will produce savings of 237.8 million rubles.

Assessment of the performance of the subsector's enterprises and associations in 1981 revealed that on the whole they did cope with fulfilling the targets of the targeted comprehensive subprogram for reducing the norms of the consumption of the principal types of metal products and fuel-power resources. In particular, they reduced these norms 3.9 percent as regards ferrous rolled stock, 0.26 percent as regards fuel, 2.8 percent as regards electrical energy and 1.66 percent as regards thermal energy.

Savings of rolled metal in 1981 totaled 59,900 tons. Of this total, 26,300 tons were saved owing to the introduction of progressive technological processes for the fabrication of components and elements; 26,700, owing to improvements in the design of machinery and equipment; 3,900 tons, owing to the use of rolled metal of improved quality and economical rolled shapes; and 3,000 tons, owing to the introduction of substitutes.

The actual reduction in the norms for the consumption of fuel and energy amounted to 0.62 percent of fuel (7,200 nominal tons of fuel), 4.4 percent of electrical energy (113.2 [million] kwh) and 3.4 percent of thermal energy (192,600 gigacalories).

The experience gained in implementing the tasks of the targeted comprehensive program for conservation in 1981 demonstrated the need to intensify the activity of the collectives of all-Union industrial and production associations and enterprises, research and development institutes and design bureaus, and the subsector's rationalizers and inventors, in order to introduce into production as rapidly as possible progressive designs of machinery and equipment, resource-saving technologies, and follow a strict regime of conservation of material, fuel-power and manpower resources.

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## CONSTRUCTION MACHINERY AND EQUIPMENT

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OFFICIALS' REPORTS TO ALL-UNION CONFERENCE ON ECONOMY OF MATERIAL RESOURCES

Leningrad TSEMENT in Russian No 7, Jul 82 (signed to press 24 Jun 82) pp 2-3

[Unsigned article: "Conserve Material and Fuel-Energy Resources: Summation of the All-Union Conference" under the rubric "Translate the Decisions of the 26th CPSU Congress Into Reality!"]

[Text] In his address to the All-Union Conference on the Conservation of Material Resources, I. N. Dmitriyev, head of the Construction Department at the CPSU Central Committee, declared: "In the Report of the CPSU Central Committee to the 26th party congress comrade L. I. Brezhnev especially noted that our progress will increasingly depend on a competent and effective utilization of all available resources--labor, fixed assets, fuel, raw materials and the produce of field and farm. Leonid Il'ich especially emphasized that 'the economy should be economical.'"

The speaker pointed out that a special place in the system of measures to conserve resources is occupied by problems of a thrifty and rational consumption of fuel and energy. The enterprises and organizations of the construction and building materials industries are major consumers of fuel-energy resources. Cement enterprises alone consume more than 22 million tons of commercial fuel each year--this is one-third of all fuel consumed by the building materials industry. It would seem that the efforts of the subsector's scientists and experts should be focused precisely in this direction. But the slow pace of decrease in unit fuel consumption at cement plants says otherwise.

The USSR Ministry of Building Materials Industry and the subsector department of the USSR Gosplan should work out a coordinated policy for the long-range development of the cement industry and implement it consistently.

Further, I. N. Dmitriyev stated that the drafting of a unified administrative-legal charter has long been under discussion. It is time to clearly define the material and moral responsibility of those participating in the consumption of resources on construction sites. It is time to establish firm order in their accounting and storage as well as in the matter making the culprits reimburse the losses due to defects in and spoilage of products, overconsumption, and shortages of building materials, products and structural elements.

Cost-effectiveness principles should be more broadly introduced in the work of the brigades, i.e. of the collectives on which it depends whether resources are conserved



or misspent. The brigade system is not just a fad but our general line, and this matter should be attended to seriously by everyone from the minister to the brigade leader.

It is necessary to expedite the development and introduction of more effective economic instruments, effective material and moral incentives to be granted to collectives and individual workers for a thrifty and rational utilization of resources. It also is necessary to expedite the development of collective, brigade-wide and individual forms of responsibility of the workers for the conservation of material values. Such questions should also be central to the organization of socialist competition.

In conclusion, the speaker pointed to the great role of the primary party organizations and party groups at enterprises and on construction sites in the nationwide campaign for thrift and conservation.

In his speech, A. I. Yashin, USSR Minister of the Building Materials Industry, noted that there exist several directions in the work to conserve raw material, fuel-energy and other material resources within the subsector.

The principal such direction is the priority development of the manufacture of products that assure a reduction in the metal-intensiveness, cost, and labor-intensiveness of construction as well as in the weight of buildings and structures while at the same time augmenting their heat insulation. To this end, the output of high-grade, multi-component and special-purpose cements will be increased during the 11th Five-Year Plan.

A second direction is expediting the development and introduction of energy-saving technologies in the production of cement and other building materials.

The speaker further noted that in the past years the task of providing construction with basic materials and products--glass, cement, slate, roofing materials, etc.--has been in the main accomplished.

Measures to conserve fuel-energy and material resources are the basis for the targeted comprehensive scientific-technical programs and plans for re-equipping enterprises developed within the subsector.

The principal direction of the conservation of fuel in the cement industry will be the further expansion of the dry method of cement production, which has been introduced at the Karaganda, Novospassk and other cement plants.

I. A. Lanshin, the Chairman of the Central Committee of the subsector's trade union, declared that the task of a thrifty and rational utilization of building materials and products is an important national task.

Now the rules being drafted for competition among the collectives of construction sites and enterprises include among the basic indicators the reduction in material expenditures and conservation of resources. Collective bargaining agreements have been revised to include specific pledges to conserve raw and other materials and fuel and energy.

An important direction in the struggle for conservation is the organization and conduct of the all-Union public inspection, the mobilization of broad masses of working people for an active participation in that inspection.

In the past five-year plan period rationalizers at construction organizations and building materials enterprises have made more than 1.5 million suggestions resulting in savings of more than 3.3 billion rubles.

A major contribution to the struggle for thrift and conservation is made by the permanent production conferences, at which 55,000 suggestions serving to save 150 million rubles have been made. More than 9,000 collectives have reexamined and increased their earlier pledges to conserve raw materials and fuel and energy.

I. I. Ishchenko, Deputy Chairman of the USSR Gosstroy, stressed that the role and tasks of the organizations of the USSR Gosstroy are to outline effective paths of assuring the specified volume of the conservation of resources in construction.

A major instrument for expediting technological progress should be the targeted-program method of the planning and implementation of scientific and technical achievements.

The production of building materials and products necessitates a drastic fivefold or fourfold expansion in the volume of the utilization of industrial wastes, especially the ashes and slags of the TETs [Thermal Electric Power Stations].

The various sections at the conference discussed the problems of reducing material-intensiveness and conserving material resources not only from the economic standpoint of cutting production cost and increasing income and profitability of production but also from a different standpoint--that of manufacturing thousands of different products owing to the savings thus achieved.

Three ways of accomplishing these tasks were outlined: reduction in material-intensiveness of structural elements and products; implementation of various technical measures to intensify production and replace or modernize obsolete equipment and increase in heat mass transfer as well as reduction in the proportion of defective output; and improvements in the utilization of mineral raw materials as well as the establishment of comprehensive and combined types of production based on a maximal utilization of secondary resources and the wastes of other subsectors.

The cement-industry employees participating in the work of the sections included the speakers A. M. Dmitriyev, director of the NIItsement [Scientific Research Institute of Cement], V. P. Goncharov, chief engineer at the Glavvostoktsement [Main Eastern Cement Administration] and B. I. Luzhnov, chief engineer at the Angarsk Cement and Mining Combine.

In his address, V. P. Goncharov declared that the Glavvostoktsement's work to reduce the unit adjusted fuel consumption in clinker kilns was characterized by the following indicators during the 10th Five-Year Plan period: 228.5 kg/ton in 1976; 225.7 kg/ton in 1977; 223.0 kg/ton in 1978; 222.0 kg/ton in 1979; and 220.8 kg/ton in 1980.

One of the leading enterprises of that administration, the Zhigulev Combine of Building Materials, operates a school of advanced knowhow training workers in the principal occupations. In the school's curriculum considerable attention is devoted to problems of a rational utilization of material resources. It trains more than 100 persons annually.

In the last year 1981, 18 enterprises participated in the All-Union Inspection of the Effectiveness of Utilization of Raw and Other Materials and Fuel-Energy Resources.

Certificates of the VTsSPS [All-Union Central Council of Trade Unions], the Komsomol Central Committee and the USSR Gosnab for attaining the best indicators in this respect were awarded to the Angara Combine and the Teploozersk Plant, and a Certificate of Merit was awarded to the Zhigulev Combine. These enterprises alone have saved material resources worth 239,700 rubles.

In 1981 the administration's enterprises saved 18,600 tons of adjusted fuel, including 12,600 tons saved in calcining clinker; 7.99 million kwh of electrical energy and 79,600 giga-calories of thermal energy.

The greatest savings of fuel were achieved by the Katav-Ivanovsk Cement Plant--3.4 percent, followed by the Gornozavodsk Plant with 1.2 percent and the Topkinskiy and Teploozersk plants and the "Sukholozhsktsement" Sukholozsk Cement Combine with 0.6 percent each (in percent of actual consumption in the preceding year).

The Zhigulev Combine and the Ul'yanovskiy, Novotroitskiy, Korkinskiy and Krasnoyarskiy plants have been operating at a stable low unit fuel consumption, while the best results were achieved by the collective of the Novospasskiy Cement Plant, which spent 139.3 kg of adjusted fuel per kg of clinker calcined.

Upon enlisting the participation of the collectives of scientific research and project-design organizations, a comprehensive program for the conservation of fuel in the cement industry during the 1981-1985 period and until 1990 has been developed. The implementation of that program will enable the Glavvostoktsement to reach in 1985 a planned fuel consumption norm of 214.8 kg per ton of clinker calcined.

In his concluding address I. N. Dmitriyev, head of the Construction Department at the CPSU Central Committee, pointed out that the conference worked out a program for concrete and useful measures and that the main thing now is to implement them. To this end, all sectors of capital construction should operate in a well-organized and conscientious manner, with a feeling of high responsibility and a thrifty attitude toward national wealth should be consistently inculcated in everyone. Success in this direction means multiplying the riches of our country.

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## BUILDING MATERIALS

### IMPROVING THE QUALITY OF BUILDING MATERIALS DISCUSSED

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 7, Jul 82 (signed to press 29 Jun 82) pp 2-5

/Unsigned article: "Improve the Quality of Industrial Products Used in Construction" under the rubric "Translate the Decisions of the 26th CPSU Congress Into Reality!"

[Text] The Basic Directions of the Economic and Social Development of the USSR for the Years 1981-1985 and the Period Until 1990 provide for marked improvements in all types of production along with the expansion and updating of the variety of products in accordance with present-day needs of economic development and scientific and technical progress as well as with the growing needs of the population. State standards and a strict observance of their requirements are a most important means of improving the quality of production.

Each year the USSR Gosstroy verifies the observance of the requirements of state standards by enterprises of the building materials and construction industries. This is done in cooperation with the Gosgrazhdanstroy [State Committee for Civil Construction and Architecture], the Union republic gosstroys, ministries, departments, and research and design organizations. In 1981 observance of the requirements of state standards was verified at enterprises of more than 20 all-Union and Union-republic ministries as well as of a number of departments and main administrations.

The findings of such inspections show that individual supplier enterprises, ministries and departments are indeed working to improve the quality and offsite readiness of structural components as well as the quality of products, components and materials. As a result, many of the inspected enterprises, which fabricate structural glass, ceramic facing tiles, polymeric materials, facing panels of natural rock, mineral powders for road surfacings, and plumbing fixtures, basically do observe the requirements of the standards.

On the other hand, crude violations of the requirements of state standards are tolerated at enterprises fabricating reinforced-concrete structural components and products, wood components for smaller buildings, nonmetallic building materials, light-concrete aggregates, asbestos-cement products, wall materials, roofing materials, waterproofing materials, heat insulating materials, and hand tools for construction. This results in waste of materials, higher production costs, and greater labor-intensiveness of construction along with, in a number of cases, lower reliability and durability of structural components.



the principal causes of the fabrication of products which do not meet the requirements of state standards are violations of production-technological discipline by enterprise personnel and failure of the ministries and departments to pay sufficient attention and be sufficiently demanding toward the problems of production quality. At many enterprises the adopted technologies are defective, low-quality materials and accessories are used, equipment and tools are worn and improperly repaired, operational control is at a low level, the available control and measuring instruments are inadequate, and quality inspection services are insufficiently staffed with skilled personnel.

For fabricating and selling products that do not meet the requirements of state standards, as established by means of spot checks, in 1981 72 enterprises were temporarily enjoined from selling their products until their shortcomings would be eliminated and 76 enterprises were subjected to economic sanctions by excluding 3.46 million rubles of output from their plan-fulfillment reports and transferring 370,000 rubles of their income to the state budget.

The quality of nonmetallic building materials was inspected at enterprises of a number of ministries and departments. Despite some improvements in the quality of rubble, gravel and sand, most enterprises continue to violate the state-standard requirements as regards basic quality parameters: 61 enterprises were found to violate the standards for granular composition and 38, the standards for the content of dust, clay and silt particles as well as for the content of comminuted granules and soft rocks in rubble. Many enterprises moreover were found to violate the standards as regards the modulus of grain size of sand. Thus, the Zagorskiy Sector of the "Gidromekhanizatsiya" Trust of the Zagorskaya GAES [Pumped-Storage Electric Power Plant], administered by the USSR Minenergo [Ministry of Power and Electrification], produced nonstandard gravel for the heavy concrete used in hydrotechnical structures, and consequently economic sanctions were imposed on that administration.

The quality of sand is particularly unsatisfactory. The USSR Minstroyaterialov [Ministry of the Construction Materials Industry] is not taking due measures to organize the mass production of concentrated sand and introduce advanced technologies for its concentration, which results in the use of tiny-grained natural sands, with a high content of dust and clay particles, for the preparation of concrete mixes. Inspections at 48 enterprises resulted in imposing economic sanctions or prohibiting sales of nonstandard output. The enterprises affected included 15 enterprises of the USSR Minenergo, 10 of the USSR Minstroyaterialov, 6 of the Glavlenstroyaterialy [Main Leningrad Administration of the Building Materials and Elements Industry], 4 enterprises each of the USSR Minsel'stroy [Ministry of Rural Construction] and the MPS [Ministry of Railways], 2 enterprises each of the USSR Minpromstroy [Ministry of Industrial Construction], the Glavmospromstroyaterialy [Main Moscow Administration of the Building Materials and Elements Industry] and the Republic Kolkhoz Construction Association [RSFSR], etc.

Seven of the 25 inspected enterprises of various ministries and departments fabricating lightweight aggregates for concretes were found to violate the requirements of state standards as regards the granular composition of fractions, the form coefficient, and the content of crushed grains and lime inclusions. Keramzit gravel was found to be improperly stored. An inspection of the Dzhuminskiy Quarry of the USSR Minstroy [Ministry of Construction] in Samarkand resulted in an order

prohibiting sales of its nonstandard output, while economic sanctions were applied to the Taldy-Kurgan Plant and the Semipalatinsk Combine of the Kazakh SSR Minsel'stroy as well as to the Aktyubinsk Reinforced Concrete Products Plant No 70 of the Kazakh SSR Mintyazhstroy [Ministry of the Construction of Heavy Industry Enterprises].

The observance of the requirements of state standards for the fabrication of precast reinforced concrete components and products was verified at many enterprises of ministries and departments. Structural components and elements designed for public, residential, industrial, rural, transport and hydrotechnical construction were inspected. Work is under way in the branch to organize the production of progressive series of standard structural components. New technological lines are being introduced. Effective materials are finding application. At the same time, however, the fabrication of products that violate in many ways the requirements of state standards is still continuing: 168 inspected enterprises were found to exceed the tolerances for geometrical dimensions of products, install steel inserts and reinforcement frames improperly, perform finishing and facing operations unsatisfactorily, and fabricate products containing impermissible pores, pits, cracks and chipped surfaces. For example, the Yaroslavl House Construction Combine No 1 of the USSR Minstroy was found to fabricate all of its products with off-design positioning of inserts and anchor ends of reinforcement, with 40 percent of its products displaying exposed reinforcement and with shrinkage cracks on all of its panels, ventilation blocks and staircase landings. Economic sanctions were applied to this combine.

Some enterprises were found to produce structural components with a lowered loadbearing strength. The following were found to produce concrete of a strength 15-20 percent lower than required: the Makhachala, Chernovtsy and Ivano-Frankovsk combines of the USSR Minpromstroy; the Fergana DSK [house construction combine] of the USSR Minstroy; the Kalach Reinforced Concrete Products Plant of the USSR Minsel'stroy, and others. The Mozyr' Reinforced Concrete Products Plant of the Belorussian SSR Minsel'stroy and the Kolchedan Reinforced Concrete Products Plant of the Mintransstroy [Ministry of Transport Construction] were found to fabricate roofing panels with loss of stress in armature rods, breakage of rods, slippage of anchor bolt washers, and other violations.

The quality of the products of woodworking enterprises still remains low. At 12 inspected enterprises producing structural elements and components for smaller wooden buildings (enterprises of the USSR Minlesbumprom [Ministry of the Timber, Pulp and Paper, and Wood Processing Industry], the USSR Minsel'stroy, and the Republic Kolkhoz Construction Association [RSFSR]), production is not meeting the requirements of standards. Building components, window and door units, floor boards and milled components are made of lumber with a moisture content that is 20-25 percent too high and are not subjected to antiseptic treatment. Window and door units sag and display loose corner joints; they are moreover made of unplanned components that display cracks and impermissibly rough surfaces and contain knots. The dimensions of wall panels, beams, roof trusses, roof tiles, and window and door frames are off-design. Wall panels are not compactly lined with heat insulating materials, and door hinges are installed with a spacing of 70 mm instead of the designed 40 mm, which reduces the strength of doors. For fabricating products that crudely violate the requirements of standards, the Khor Combine of the USSR Minlesbumprom and the Bogorodskiy and Makar'yevskiy combines of the Republic Kolkhoz Construction Association [RSFSR] were subjected to economic sanctions.

Spot checks were conducted at 27 joinery products enterprises. It was found that many of them fabricate products not meeting the requirements of standards. Their joinery products are made of low-grade high-moisture lumber. Most of their window and door units have edge clearances that are 3-5 mm too large and display impermissible deviations from design dimensions.

The doors and windows fabricated by enterprises display a low degree of offsite readiness: they are unglazed, lack gaskets, coated with just one primer paint, or merely varnished, and supplied without correcting their defects as well as without fittings. As a rule, the products are stored outdoors without being protected against atmospheric precipitation. Most woodworking enterprises need to be modernized and their drying, storage and assembling facilities need to be expanded.

The spot checks resulted in imposing economic sanctions for the production of nonstandard joinery products on 12 enterprises, of which 3 enterprises of the USSR Minsel'stroy, 3 of the USSR Mintyazhstroy, 2 of the USSR Minpromstroy, and one each at the USSR Minlesbumprom, the Minvostokstroy (Ministry of Construction in the Eastern Part of the USSR), and the Main Kiev City Construction Administration.

The operating qualities of joinery products as well as heat retention in buildings depend to a large degree on the quality of door and window fittings. At 17 of the inspected enterprises producing door and window bolts and locks, violations of the standards for the machining of surfaces and the quality of protective-decorative coatings were established. The inspected locks, fasteners, door and window handles, and chains were found to be off-design in shape and geometrical dimensions. The enterprises continue to manufacture products from materials not envisaged in the standards, which adversely affects the reliability, durability and external appearance of door and window fittings.

Inspections of the quality of asbestos-cement products at 10 enterprises of the USSR Ministroy materialy established that, while the strength indicators and frost resistance of the produced asbestos-cement sheeting have improved, a number of enterprises still do not meet the requirements of state standards. Thus, tests of asbestos-cement pipe showed that the frequency of the violations of strength indicators in 1981 had even increased. The largest number of violations as regards pipe strength was found at the Bryansk, Korkinskiy and Serebryakovskiy combines, and as regards waterproofing--at the Alekseyevskiy Combine and the Akhangaran Cement Production Association. The Bryansk and Korkinskiy combines of the USSR Ministroy materialy were enjoined from selling their products owing to the low strength of the pipe they manufactured.

Quality of bricks was verified at enterprises of the USSR Ministroy materialy, the USSR Minpromstroy, the Mintransstroy, the USSR Minsel'stroy and the Main Moscow Administration of the Building Materials and Elements Industry. The inspected clay brick plants produce chiefly ordinary solid ineffective bricks, often in the low "100" and "75" grades. At most plants bricks do not meet the requirements of standards as to dimensions and external appearance (cracks, skewed edges and surfaces, chipped surfaces, etc.) and even weight. In most cases, technological rules are not being observed.

In a number of cases, as much as 60 percent of the entire output did not meet the standards.

Inspections of the quality of silicate brick at a number of plants revealed instances of the production of bricks not meeting the requirements of standards as regards external appearance and geometrical dimensions. The Petrozavodsk Plant of the RSFSR Minstroymaterialov produces silicate bricks that are nonstandard in 50 percent of cases. The inspections led to the application of economic sanctions to 12 plants as well as to orders prohibiting sales of nonstandard output at, among others, 10 enterprises of the USSR Minstroymaterialov.

The USSR Minstroymaterialov and the Minstroydormash [Ministry of Construction, Road and Municipal Building] are not taking appropriate steps to convert silicate brick plants to the production of hollow modular bricks. Many enterprises continue to produce bricks weighing 5 and more kg instead of 4.3 kg as prescribed by the standard, which reduces labor productivity and results in occupational diseases of stone-masons.

At certain enterprises of the USSR Minstroymaterialov that produce roofing and waterproofing materials, inspections revealed major violations of state standards as regards bulk per square meter, quantity of covering composition, and impermeability to water.

The quality of heat insulating materials was verified at 17 enterprises of the USSR Minstroymaterialov, the USSR Minchermet [Ministry of Ferrous Metallurgy], the USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work], and the Glavlensstroyaterialov. It was found that at these enterprises a large part of output does not meet the standards as regards physical and mechanical properties. A lot of high-strength grade-200 panels with synthetic binder, fabricated by the Rostov Rigid Mineral-Wool Panels Plant of the USSR Mintyazhstroy, did not meet the requirements for compressive strength. Major violations of standards for production quality were found at the Vladimir Ceramic Products Plant of the RSFSR Minstroyaterialov, the Riga Cement-Slate Plant of the Latvian SSR Minstroyaterialov, and the Rostov Rigid Mineral-Wool Panels Plant of the USSR Mintyazhstroy.

At many plants, mineral-wool products are stored improperly, violating the standards--about 70 percent of the products is stored outdoors. Laboratory tests of finished products are incomplete and often performed by nonstandard techniques (violating the prescribed periodicity).

Hand tools for construction and installation operations were tested for meeting standards at 28 enterprises of various ministries and departments. It was found that more than 60 percent of the inspected enterprises manufacture tools that do not meet standards and specifications. The greater part of the inspected lots of tools displayed impermissible deviations of geometrical dimensions, operating surfaces of substandard hardness, an unsatisfactory finish of surfaces. In addition, the packaging, marking and storage requirements for these tools were being violated. The low quality of construction hand tools reduces the productivity and quality of labor.



During the first quarter of 1982 117 enterprises were inspected, including 75 enterprises of the USSR Minpromstroy, 19 enterprises of the USSR Ministroymaterialov, 9 enterprises of the USSR Minstroy and 14 enterprises of other ministries. Inspections of the fabrication and sales of products not meeting the requirements of state standards resulted in the application of economic sanctions to 14 enterprises: about 500,000 rubles of substandard output was deleted from plan-fulfillment reports and 34,500 rubles of income was transferred to the state budget. Fifteen enterprises were enjoined from selling their substandard products.

The inspections revealed violations of standards for reinforced-concrete structural elements, nonmetallic mineral raw materials, bricks, etc. Thus the ZhBI-1 (Reinforced Concrete Products Plant No 17 of the Odeszhelezbeton (Odessa Reinforced Concrete Production Association) under the USSR Minpromstroy was found to have an output of pillars, crossbars and roofing slabs that consisted 60 percent of substandard products. It was further established that at that plant the strength of prestressed reinforced concrete piles and roofing and floor slabs was 30-35 percent lower than designed. The plant was ordered to stop selling its piles and slabs and subjected to economic sanctions by deleting 790 cu m of these products, worth 57,600 rubles, from its plan-fulfillment reports.

The ZhBK-2 (Reinforced Concrete Structural Components Plant No 27 of the Main Kuzbass Construction Administration under the USSR Mintyazhstroy was found to fabricate products containing concrete of substandard strength, to violate regularly the requirements as to the design of reinforcement frames, to fabricate reinforced-concrete structural components with off-design cross sections, and occasionally to produce and ship floor slabs lacking reinforcement. It was also found to violate crudely the standard procedures for the strength inspection of concrete and reinforced-concrete structural elements. Further, it did not adhere to the designed cubic volume of lightweight concrete and heat insulating materials for insertion in three-layer outer wall panels, which adversely affects the heat-retention qualities of exterior walls. In their appearance and degree of offsite readiness most of the plant's products do not meet the requirements of the standards. The plant was enjoined from selling nonstandard products and subjected to economic sanctions by deleting 2,066 cu m of its output, worth about 100,000 rubles, from its plan-fulfillment reports.

The Adlerskiy Experimental Reinforced Concrete Products Plant of the Main Sochi Special Construction Administration under the USSR Minpromstroy fabricates products that crudely violate the standards as regards the precision of their geometrical dimensions. The actual deviations of the dimensions of its interior- and exterior-wall panels exceed the tolerances by a factor of 7-8. Economic sanctions were imposed on the plant, with substandard output worth 9,900 rubles being deleted from its plan-fulfillment reports.

An inspection in 1981 revealed that the sand-and-gravel plant of the Orel Construction Administration under the USSR Minpromstroy was producing and selling products not meeting the requirements of the standards. The enterprise was penalized by excluding 2,400 cu m of substandard products from its plan-fulfillment reports. A second inspection, conducted in 1982, revealed the presence of the same violations (excessive content of gravel particles larger than 10 mm in the sand, excessive content of dust and clay particles).

A second inspection of the Yemanovskiy Sand Quarry under the "Priokskstroytrans" /Oka River Valley Transport Construction Administration/ of the USSR Minpromstroy, conducted in 1982, revealed that the proposals of the commission for eliminating the violations of standards established in 1980 were not implemented. The sand still does not meet the standards for granular composition, modulus of strength and content of dust and clay particles. As a result, the Yemanovskiy Quarry was once more enjoined from selling its output and penalized by deleting 10,000 cu m of sand worth 3,500 rubles from its plan-fulfillment reports.

A low quality of output was established at the Bronnitskiy Brick Plant of the Main Moscow Administration of the Building Materials and Elements Industry, where rejects reach 28 percent of the output. The bricks produced by that plant have chipped corners and edges, irregular edges and surfaces and cracks reaching 30 mm in depth, along with a high content of straw pieces (up to 17 percent), uneven calcining and other defects.

Analysis of the findings of the inspections shows that the organizational work to improve the quality of production, refinements in production technologies, and the tightening of responsibility for the observance of technological and production discipline by enterprises, ministries and departments are not being carried out on a sufficient scale. Ministries and departments do not conduct systematic administrative monitoring of the observance of standards at enterprises and organizations.

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PRODUCTION OF SPECIAL REINFORCED CONCRETE IN 11TH FYP DISCUSSED

Moscow BETON I ZHELEZOBETON in Russian No 7, Jul 82 (signed to press 11 Jun 82)pp 2-3

[Unsigned article: "Production of Special Reinforced Concrete in the 11th Five-Year Plan Period"]

[Text] A mighty industrial base has been established in this country for the production of special-purpose precast reinforced concrete structural elements--pipe, crossties, transmission line poles, overhead-network and lamp pylons, tubings, tunnel facing, road and airport PAG [expansion unknown] paving slabs, vineyard trellises, etc.

Such structural elements are fabricated chiefly from concrete of the M500-M600 grades and higher, on using high-strength cold-drawn reinforcement wire. This serves to prolong their service life by a factor of 3-4 and save substantial quantities of metal compared with the use of analogous metal pipe, tubing and poles or wooden crossties, pillars, mine timbering and trellises.

The production of hydrovibration-molded and centrifuged pressure pipe of reinforced concrete in lieu of steel or cast-iron pipe of 1000 mm diameter serves to reduce metal consumption by 112 and 485 tons, respectively, per km of pipeline. The use of reinforced-concrete crossties in lieu of wooden crossties saves one hectare of forest per km of railroad track.

In the last 20 years the production of special-purpose reinforced concrete structural elements has more than tripled. This increase has been particularly marked as regards the output of pressure pipe--by a factor of 30, and crossties, by a factor of 8. Altogether more than 4 million cu m of delivery pipe and approximately 150 million crossties have thus been fabricated.

In 1980 the output of special reinforced concrete totaled about 6 million cu m, of which: 1.7 million cu m of pressure and other pipe; 0.9 million cu m of crossties; 1.4 million cu m of pylons; and about 1 million cu m of trellis stands. The output of reinforced concrete pipe and pylons in this country has come close to the level of that in the United States, while its output of reinforced concrete crossties exceeds that of the most highly developed capitalist countries.

About 35 percent of the output of reinforced concrete pipe is produced in the form of delivery pipe of 250-2000 mm diameter, designed for pressures of 5-15 atmospheres. Three-fourths of pipe of this kind is produced by a single-stage technology with the aid of the hydrovibration-molding method, with the remainder fabricated by the

three-stage technology, chiefly with a metal core (22 percent) and in small quantities with a centrifuged reinforced concrete core.

The production of hydrovibration-molded (HVM) pipe of 500-1,200 mm diameter in 5 m long segments has been organized at 25 plants on standard lines with capacities of 11,000 and 60,000 cu m of pipe annually. In addition, the Moscow plant is organizing the pilot production of pipe of 1,400-1,600 mm diameter. High indicators have been achieved by the Zaporozh'ye Special Reinforced Concrete Plant and the Leningrad Pipe Plant of the "Barrikada" Association; in particular, the Zaporozh'ye Plant displays the lowest indicators of labor-intensiveness--13 manhours per cu m, and its output of class-1 and -2 HVM pipe has reached 80 percent.

The fabrication of 5 and 10 m long 250-600 mm diameter pressure pipe with a metal core, designed for pressures of 5-15 atmospheres, has been organized by about 60 enterprises in this country. It is characterized by a high productivity per linear meter, but the consumption of metal for this pipe is greater by a factor of 5-6 than for hydrovibration-molded concrete pipe.

The mass fabrication of non-pressure reinforced-concrete pipe of 400-2,400 mm diameter and concrete pipe of 300-1,000 mm diameter is handled by approximately 150 enterprises in this country and based on various technologies, chiefly vibration-molding and centrifuging.

In 1979 pilot production lines for the fabrication of non-pressure pipe were put into operation. The Gnivan' Special Reinforced Concrete Plant produces 2-2.5 m long segments of 300-600 mm diameter pipe by the radial molding method at the rate of 12,000 cu m annually. The same molding method is used by the Gor'kiy Reinforced Concrete Elements Plant No 5 to produce 800-1,200 mm diameter pipe segments 3.5 m long at the rate of 30,500 cu m. Compared with the centrifuging method, the radial molding method reduces labor intensiveness by a factor of 1.7-2.2, the metal-intensiveness of equipment by a factor of 2.3-3.0 and production cost by 10-30 percent while at the same time markedly improving the working conditions.

Reinforced-concrete railroad crossties are fabricated by 16 enterprises from prestressed M500- and Mrz 200-grade concretes reinforced with uniformly spaced chords of 3 mm diameter high-strength wire. Continuous-flow crosstie production lines with capacities of 17,500 and 22,500 cu m annually are accommodated within the standard UTP 18x144 m bay. The optimal indicators have been achieved by the Caucasian Reinforced Concrete Crossties Plant, which exceeded capacity by 23 percent and reduced labor-intensiveness to 0.52 manhour per product, which is 35 percent below the mean subsector indicator.

The VNPO Soyuzzhelezbeton [All-Union Scientific-Production Association for Reinforced Concrete] has developed and is organizing a modernized conveyor line accommodated within a 18x206 m bay of the Kremenchuk Reinforced Concrete Crossties Plant. The designed capacity of that line is 32,000 cu m of crossties. A version of this line adapted to the standard 18x144 m bay has been developed as well.

Reinforced-concrete pylons for transmission, overhead-contact and communications lines as well as lampposts are manufactured by about 50 enterprises in the country. Up to 85 percent of the pylons is made in prestressed or non-prestressed form, conic with an annular cross section, and ranging in length from 8 to 26 m. They are fabricated by the centrifuging method on the basis of continuous-flow unit-head technology. The



best indicators are displayed by the Mironovskiy and Stryy plants of the USSR Ministry of Energy.

Reinforced-concrete trellis stands are fabricated in non-stressed form from grade-M500 concrete at 100 enterprises. The Eyvalekskiy Special Reinforced Concrete Combine of the USSR Ministry of the Construction Materials Industry has commenced the production of the more economical and durable prestressed trellis stands.

In the 11th Five-Year Plan period the enterprises have been charged with the task of not only sharply expanding their output but also increasing the effectiveness of the fabrication of special reinforced-concrete structural elements.

The assortment and quality of the currently produced pressure pipe still do not fully meet the needs of builders; capacity utilization has risen from 61 percent in 1975 to 73 percent in 1980. This low coefficient of capacity utilization adversely affects the unit production cost. In recent years the production cost of pressure pipe has somewhat declined but even in the best cases it still is higher than envisaged in the standard designs.

The production of pressure pipe and centrifuged non-pressure pipe entails high energy expenditures. The number of workers performing manual operations in the production of HVM pipe and crossties exceeds 25 percent of the work force. The operations involved in the fabrication of pipe, crossties, pylons and trellis stands are extremely labor-intensive and numerous, as are the auxiliary operations, especially the loading of pipe and pylons. The noise and vibration levels in the fabrication of all types of special reinforced concrete structural elements are high and often exceed the norms of hygiene of labor.

The Gnivan' Special Reinforced Concrete Plant has been slow in organizing the production of 2,000-mm diameter reinforced concrete low-pressure pipe (designed for operating pressures of 3 atmospheres) by the centrifugal rolling method.

It is worth noting that large-diameter reinforced concrete pressure pipe as well as concrete non-pressure pipe is rarely utilized in designs. The installation organizations lack specialized equipment and attachments for laying large-diameter pipe, and no purposive work in this direction is being done. The production capacities of pipe plants, which are chiefly designed for the fabrication of the most economical large-diameter pipe, are not being utilized.

Most plants have to use cement and aggregates that do not always meet standard requirements, which results in excess consumption of cement and lower quality of products.

A substantial increase in the effectiveness of the production of precast special reinforced concrete is possible only upon a rapid modernization of the existing plants on the basis of qualitatively new technological solutions. The main direction of further improvements in production is an increase in labor productivity along with a reduction in the share of manual labor, improvements in working conditions, conservation of material and fuel-energy resources, production of pipe designed for higher pressures as well as a better quality of crossties, and the attainment of designed capacity. The efforts of the leading scientific research organizations should be focused on solving these problems.

The VNPO Soyuzzhelezbeton is, jointly with the NIIZhB /Scientific Research Institute of Concrete and Reinforced Concrete/, the Giprostrozmash [All-Union State Planning and Design Institute of the Construction Industry], the Soyuzvodproyekt [All-Union Trust for the Design and Planning of Water Management], the VNIIZhT /All-Union Scientific Research Institute of Railroad Transportation/, the ISiA /expansion unknown/ and other organizations, introducing a number of projects at enterprises.

The Mineralovodskiy Plant is finalizing the installation of a modernized line for the production of HVM pipe, equipped with new reinforcing facilities (spiral-cross-over frame) on using low-noise- low-frequency vibration platforms, heat treatment with the aid of steam-jacketed molds or casings made of a special fabric, etc.

The introduction of the modernized lines will enhance productivity 15 percent, reduce the labor-intensiveness of pipe fabrication 20 percent and the share of manual labor by a factor of 1.3, and markedly improve working conditions by reducing noise and vibrations to the level where they meet the standards of hygiene of labor. It is necessary to expedite the completion and broad productive utilization of that line.

At a number of plants (Yenakiyevka, Gnivan', Benderskiy, and others) the successful use of the 10-03 and S-3 superplasticizing agents serves to increase the output of class-1 and -2 pressure pipe 8-10 percent and markedly improve the working conditions of mold operators. During the 11th Five-Year Plan period the broad use of such superplasticizing agents in pipe production should be assured.

**It is necessary** to expedite the work on the containerization of pipe transport and organization of the production of low-pressure pipe--and in the long run also high-pressure pipe--by the radial molding method. The work to develop an effective production of pipe with diameters of more than 2,400 mm for pipeline stations should be expanded. The demand for such pipe will steadily rise in the coming years.

Work on the mechanization of production and reduction of the labor-intensiveness of crosstie production is under way. The Vyaz'ma Reinforced-Concrete Crossties Plant is testing nondismountable slabs and hollow-formers, stations for mechanized installation and dismantling of gear, and other facilities and processes. Their introduction will serve to reduce the share of manual labor by a factor of 2.3 and the labor-intensiveness of the fabrication of crossties by 35-40 percent.

The work to refine the production technology of reinforced concrete pylons is focused on the conveyerization of production, mechanization of reinforcing operations and use of molds with locking joints as well as of centrifuging modes reduced to 12-15 min in duration. The implementation of these projects should enhance line productivity 30-40 percent and reduce the labor-intensiveness of pylon fabrication by a factor of 1.5 and the share of manual labor by a factor of 2.5. However, this work is conducted extremely slowly.

A complex whole of research has been carried out as regards reducing the consumption of fuel and energy resources by using heat-insulated curing chambers, induction heating of HVM pipe, and scientifically substantiated energy consumption norms, as well as automating the heat-treatment operations.

At the leading plants--the Caucasian, Kremenchug, Chelyabinsk and Daugavpils reinforced concrete crossties plants--the consumption of thermal energy amounts to 190,000-240,000

kilocalories and electrical energy, 17.5-31.0 kwh per cu m, which is markedly below the nationwide average.

Problems of automating the processes of preparing the concrete mix, prestressing of reinforcement, heat treatment, and testing and quality control of materials and structural elements are being successfully solved. Facilities for automating heat treatment which serve to reduce steam consumption 5 percent and keep track of heat consumption are being introduced. Such facilities are being series-produced as of 1982 by the Ivano-Frankovsk plant of the Minpribor [Ministry of Instrumentmaking Industry].

R&D work has commenced as regards producing pipe and crossties from high-strength concretes, low-cost complex additives based on superplasticizing agents, dispersed reinforcement, and the introduction of robots and manipulators.

The implementation of the measures enumerated above should markedly raise the technological level of the production of special reinforced concrete and accomplish the tasks facing the subsector during the 11th Five-Year Plan period.

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## BUILDING MATERIALS

### OFFICIAL URGES INCREASED CEMENT PRODUCTION, LESS WASTE

Moscow MATERIAL'NO-TEKHNICHESKOYE SNABZHENIYE in Russian No 7, Jul 82 (signed to press 18 Jun 82) pp 19-23

[Article by V. Kushchidi, Deputy Minister of the Construction Materials Industry USSR: "More Cement at Less Cost"]

/Text/ OUR COUNTRY IS ONE VAST CONSTRUCTION SITE. THE STEADY GROWTH IN THE VOLUME OF INDUSTRIAL AND HOUSING CONSTRUCTION REQUIRES A CONSTANT EXPANSION OF THE OUTPUT OF CEMENT AND ITS ECONOMICAL UTILIZATION. IN 1985 CEMENT OUTPUT AT ENTERPRISES OF THE USSR MINSTROYMATERIALOV /Ministry of the Construction Materials Industry/ SHOULD REACH ABOUT 125-130 MILLION TONS OR 7-12.9 PERCENT MORE THAN IN 1980. /printed in boldface/

/Text/ A considerable variety of cement is being produced at present. This variety will be still further expanded during the 11th Five-Year Plan period. The quality of cement will have to be optimally improved while at the same time maximizing the conservation of fuel and energy resources. By the end of the five-year plan period the output of cement with State Quality Label is scheduled to reach 34 percent of total output. High-grade cements will be produced at a faster rate in the Urals, Siberia and the Far East. The output of special-purpose cements such as sulfate-resistant and decorative cements will increase 30 percent and the output of grouting cement, by a factor of 1.3 to 1.5.

Currently the cement industry is not completely fulfilling the tasks as to the output of certain types of high-grade cements. This is due not only to objective reasons but also insufficient interest of the industry. The problem is that the current indicators of the subsector's performance, and chiefly the average cement grade, do not stimulate the production of higher grades of cement. The planned indicators of volume and of quality are not properly interrelated.

The current stress on a consistent increase in the planned average grade of cement inevitably results in a rise in the unit consumption of fuel and electricity and requires additional capital investments. Average grade is a generalized characteristic of the quality of the cement produced. This logically raises the question of whether this indicator should be made a fetish of, whether the focus should be on an unlimited increasing of average grade, and whether such an approach meets the interests of the national economy?



Each cement grade has its own particular applications, as defined by construction norms and rules. In the preparation of concrete the replacement of a particular recommended grade of cement with a higher or lower grade causes losses of cement and a rise in the cost of concrete. A substantial increase in the average grade can be achieved only by reducing the output of grade-300 cement, which is the most widely used grade. But this would cause substantial losses to the national economy, for the replacement of five or six million tons of grade-300 cement with an equal quantity of grade-400 cement would require increasing the consumption of clinker by 700,000-800,000 tons annually and spending an additional 150,000-170,000 tons of fuel.

Planning based on a scheduled increase in the average grade of cement used to meet optimally the demand of the national economy for high-grade cements. But now that the demand for these cements has been satisfied, the average grade of cement should be stabilized at the level of 407-410 within the next few years. This is the optimal level in relation to the current development of the construction industry. A new system of indicators reflecting more fully the end-results of production should be adopted. Above all, cement production should be planned by assortment. This will help make greater allowance for internal potential and contribute to technical progress within the subsector on taking into account the optimal consumption of fuel-energy resources and the interests of the national economy.

An important potential for increasing production is the operation of the existing enterprises at a level at which their full designed capacity is reached. So far this has not been possible. During the 10th Five-Year Plan period, for example, the kiln utilization coefficient declined and plan-exceeding stoppages increased. This was due to, among other things, interruptions in the supply of fuel to the plants and frequent breakdowns of technological equipment. Increasing the reliability of equipment, which leaves something to be desired, depends primarily on a smooth supply of raw materials and fuel and on quality repairs in accordance with the preventive repair plan. The quality of producer supplies--roller bearing casings, heat-transfer furnaces, grate coolers, and many other components and elements--has to be markedly improved.

The cement enterprises are broadening the variety of cements produced, improving their quality and increasing the output of high-strength grades. But even so, there is a shortage of cement. Why? Because vast quantities of cement are wasted during the production of concretes and mortars and reinforced-concrete products as well as while in transportation and in construction. The manner in which cement is used does not fully meet the present-day tasks as to the thrifty conservation of material resources. An advance study by experts at the USSR Gosstroy has revealed that the losses and overconsumption of cement reach about 10 million tons annually. The "production" of these losses costs some 2 million tons of nominal fuel and nearly 1 billion kwh of electrical energy.

Most of these losses are avoidable and preventable. It is important in this connection to improve the matching of the variety of cement produced to the variety of concretes planned for production and to reduce direct losses by streamlining the performance of dust-collection facilities at grinding shops as well as during loading onto means of transport.

Moreover, losses at the boundary line between production and consumption can be reduced by curtailing or, even better, discontinuing the conveyance of cement by nonspecialized means of transport and preventing the mixing of different types and grades of cement by customers. The losses of cement due to its transportation in

non-specialized types of railroad rolling stock reach 3-5 percent, which is tenfold higher than the losses during the shipping of cement in specialized means of transport.

Customers should pay more attention to reducing the losses and overconsumption of cement. The mixing of different grades, poor operation of proportioning hoppers, and the use of worn molds and substandard aggregates account for about 70 percent of all losses. Of the remainder, roughly 19 percent of all losses is sustained during the conduct of construction and installation operations, owing to the in-transport losses of concrete mixes, defects of loading and unloading equipment, and improper processing and storage of cement on construction sites.

Considerable overconsumption of cement is due to failure to use it according to purpose and the lack of special cements designed for the preparation of construction mortars. The USSR Gosstroy, the USSR Gosstnab and the USSR Ministry of the Construction Materials Industry have drafted measures to eliminate these shortcomings.

A growing volume of cement production and the fulfillment and overfulfillment of targets of the state plan characterize the leading enterprises of the subsector. The cement industry includes a large group of stably operating plants which cope with the plan targets. Even despite shortages of certain material-technical resources, these enterprises succeed in exploiting their internal production potential. For example, the collectives of the Akmyansk and Sebryakovskiy cement plants not only overfulfill the plan targets for cement output but also have achieved substantial savings of raw-material, fuel-energy and other material resources. They have also achieved the lowest fuel consumption per ton of clinker in the nation's cement industry.

Practice shows that enterprise collectives can accomplish a great deal if they manifest initiative and a proprietary concern for a thrifty utilization of available resources. This is highly important considering that the cement industry is a major consumer of fuel, energy and other resources. Fuel accounts for 23 percent, and electrical energy for 11.8 percent, of the production cost of cement. Moreover, each ton of cement produced means the consumption of 2 kg of refractories, as well as many other expensive and scarce materials.

To the national economy it is important not only to increase the output of cement but also to produce it more economically. To save cement means to save fuel, electrical energy and raw and other materials. Currently the production of clinker consumes about 25 million tons of fossil fuel and 15 billion kwh of electrical energy.

Year after year, the cement-industry enterprises have been reducing the unit norms for the consumption of fuel in the calcining of clinker. During the 10th Five-Year Plan period the unit consumption of nominal fuel dropped from 228.9 to 225.2 kg per ton, thus resulting in saving 360,000 tons of nominal fuel.

In the 11th Five-Year Plan fuel conservation is still further promoted. The plan provides for reducing to 219.3 kg per ton the unit consumption of nominal fuel in the calcining of clinker, for the subsector as a whole. This is a difficult but feasible task. It should be accomplished by operating at designed capacity the

existing and newly introduced technological lines, modernizing and replacing obsolete equipment, using closed-cycle grinding units and automatic crushing mills and sharply reducing unplanned stoppages of equipment. Some 0.7 million tons of nominal fuel has to be saved, which is twice as much as was saved during the previous five-year period. This figure is based on thorough calculations and specific projects, incorporated in the plan of the related measures for the period until 1985 and for the 12th Five-Year Plan period.

The conservation of energy resources is a multifaceted task. A major direction in this respect consists in improving the utilization of the existing capacities, especially of 185-meter rotary kilns. If they operate at full capacity, we will produce an additional 2 million tons of cement, at least, and save considerable fuel and energy resources. This would make it possible to commence the retirement of worn and obsolete ineffective short rotary kilns burning fuel at the rate of 300-400 kg per ton as opposed to the subsector-wide average of 222.4 kg per ton.

Conversion from wet to semi-dry and dry cement production techniques is highly effective. In the wet method of production, one-third of the fuel burned in the kilns is spent on compensating for the losses in the exit gases as well as for the evaporation of water from the slurry. To reduce fuel losses, the moisture content of the slurry must be reduced. This requires treatment with additives--sulfite-alcohol mash, lignin, metasilicate, sodium tripolyphosphate, and other chemical reagents. Rotary kilns have to be equipped with devices for dehydrating the slurry and decarbonizing the raw mixture at the expense of the exit gases, etc. During the 11th Five-Year Plan period the Sebyakovskiy Cement Plant is scheduled to put into operation a facility for the mechanical dehydration of slurry. But, as known, one "swallow" is not the harbinger of spring. Extensive production of such facilities has to be organized.

With the semi-dry method, fuel loss is reduced 20 percent compared with the traditional method. To broaden the introduction of the semi-dry method, cement industry should be provided with high-capacity filter presses and special filtration fabrics.

The employment of the dry method of cement production saves 30-35 percent of fuel and energy resources. In the current five-year period three new high-capacity production lines are scheduled for introduction--at the Krivoy Rog, Rezinskiy and Novokaragandinskiy cement plants. Great attention will be paid to renovating and modernizing the existing kilns and operating at full capacity the previously introduced production lines. Advanced knowhow in using the dry method of production has been gained at the Novospassk and Lipetsk cement plants. This experience is being studied, and personnel are being trained in using the new technology.

There are many causes of fuel and energy losses in the cement industry. Radiation accounts for considerable losses of heat during calcining: 10-15 percent of total heat consumption. Such losses can be minimized by assuring smooth operation of the kilns, using thicker lining and a thicker layer of dressing in the sintering zone and introducing facilities for the recovery of the heat of radiation.

Cement plants are introducing effective techniques for adjusting the thickness of the dressing. Operating practice at the Akmyantsementas, Novorostsement, Amvro-siyevka, Balakley, Lipetsk, Ol'shanskiy, Razdanskiy and other cement combines and

plants demonstrated the sufficient reliability of these techniques. Their application prolongs the service life of the sinter-zone lining 15-20 percent, increases hourly productivity 1-2 percent and reduces fuel consumption 1.5-2 percent.

A great deal of heat is dissipated in the waste gases of rotary kilns. This loss can be reduced by using combined high-temperature chain screens with a large heat-transfer surface and density in the cool part of the screen, as well as built-in heat exchangers. Properly selected chain screens and heat exchangers reduce to 200-230°C the temperature of waste gases in large kilns and, in addition, they reduce by 3-5 percent the consumption of heat for calcining.

To accomplish this, the subsector's enterprises need high-temperature screen chains and stainless steel for heat exchangers. Unfortunately, we are not receiving a sufficient supply of these materials. Here we need help from the USSR Gosstroy and the USSR Gosstab.

A most important direction of the conservation of fuel and energy resources consists in a broad use of the wastes of other industrial subsectors as raw material ingredients and active and inert cement additives (granulated slags, phosphogypsum, ashes and slags of TETs [thermal electric power stations], and the wastes of alumina production.

The operating experience of the Sukholozsktsement and Novorostsement combines, the Akmantsementas and Spassktsement production associations, and other cement plants that have attained the leading indicators of the reduction of unit consumption of fuel and electrical energy shows that the potential exists and can be exploited.

The cement industry annually consumes more than 30 million tons of secondary raw materials, chiefly wastes and by-products of other industrial subsectors. In 1981 it had used more than 22 million tons of blast-furnace and electrothermophosphorus slags, 3.3 million tons of belite slurries, about 1 million tons of TETs ashes and slags, large quantities of iron-containing wastes of the chemical, iron and steel, and nonferrous metals industries, and wastes of the pulp and paper and other industrial subsectors. This served to reduce 15 percent the need for natural raw materials, to trim fuel demand by 2 million tons and to save a considerable amount of electrical energy.

The volume of the demand for secondary raw materials will increase during the current five-year period. The industrial wastes used as ingredients in cement production serve to conserve natural resources, improve the chemical-mineralogical composition of clinker and improve the quality of production and, in a number of cases, reduce the moisture content of slurry by 2-3 percent.

The wastes also represent a good active mineral additive in the grinding of cement. Thus, metallurgical slags and TETs ashes improve the structural qualities of cement, increase its frost resistance, imperviousness to water, etc. This is a most important direction of the utilization of wastes, serving to produce a tremendous effect to the national economy. The use of wastes as cement additives saves an amount of clinker equivalent to an increase of at least 12-14 million tons annually in the resources of cement.



The use of secondary material resources in cement production during the 11th Five-year plan and the period until 1990 can be much greater than it had been in 1980.

The further expansion of the volume of use of by-products and wastes of other subsectors in the production of cement requires certain organizational and technical measures. The cement industry uses less than one-half of the available metallurgical slags, because not enough slag is granulated in the iron and steel industry. Yet, every ton of slag portland cement produced saves 40 percent of fuel. The cement industry is ready to use such additives on a much greater scale. This is feasible, too. For example, the current capacities of iron and steel plants suffice for granulating an additional 4-5 million tons of slags, but the metallurgists have promised to additionally granulate at most only one million tons during the present five-year period.

The use of ash and slag wastes of thermoelectric power stations in cement production is extremely low, amounting to about one million tons. The main reason is the absence of facilities, at these stations, for gathering dry ash and slag wastes and loading them onto rail transport. Such facilities, as patterned on the one introduced into operation at the Zmeyevskaya TETs, should be built, the series production of means of transport should be organized and cement plants should be prepared to receive and use these wastes. The opening of the facility at the Zmeyevskaya TETs made it possible to reduce from 500 to 30 km the distance of shipping the ashes to the Balakley Plant.

TETs ashes contain 5 to 15 percent residual fuel. This problem can be solved only with the active participation of power industry experts. At present the building materials industry receives from the power industry at most 5 million tons of ashes, with the remaining ashes--more than 80 million tons--being discarded into dumps each year. True, power industry experts have designed and built several installations for collecting dry ash. But this is very little. To improve the utilization of secondary energy and other resources, it is suggested that tasks be assigned to power experts as regards the production and supply to customers of ash wastes in the form of marketable output.

It is necessary to practice more broadly the construction of facilities for the granulation or nodulization of phosphogypsum and other sulfate-containing wastes at chemical enterprises, as well as of indoor and outdoor depots, piers and transport galleries at cement plants. A broader use of pyrite cinders, the dusts and slurries from the gas purifying facilities of iron and steel plants and the slurries of nonferrous metals plants, in cement production, is impeded by the absence of adequate loading facilities at the enterprises where these wastes are formed, as well as by shortages of means of transport for shipping them to customers. Warehouses, piers and depots should be built, and other measures should be taken, to assure the collection and loading of pyrite cinders at chemical enterprises, slags of copper-nickel production at nonferrous metals enterprises, and dust and slags at iron and steel plants.

A broader use of by-products and wastes of other subsectors in the production of cement would be promoted by a correct solution of problems of a purely economic nature, and especially of prices. It is important that the prices of secondary material resources should not exceed the binding prices of raw and other primary materials.

Cement industry pays great attention not only to reducing fuel consumption but also to conserving the consumption of electrical energy. By 1985 the unit consumption of electrical energy for the subsector as a whole should be reduced 2.2 percent. This target requires introducing energy-saving technological processes and broadening the use of automated process control systems.

It cannot be said today that the subsector has done everything possible to prevent the losses and improve the utilization of energy-fuel and other resources. Some enterprises do not follow the established norms and tolerate unplanned stoppages of kilns as well as norm-exceeding consumption of fuel and electrical energy. Not infrequently, overconsumption of fuel is due to violations of process regimes, failure to observe the parameters of slurry composition, increased moisture content of slurry.

No doubt, the observance of process parameters does not require additional capital outlays. Order and efficient organization are needed. It is highly important that cement enterprises should make maximum use of various cement additives permitted by the standards. But at a number of plants little attention as yet is being paid to this. At the Amvroseyevka, Balakley and Sterlitamak combines and the Rustavi and Starooskol'skiy cement plants such additives are used in much smaller quantities than possible. Yet, enterprises do not need additional capital outlays in order to increase cement output through an improved utilization of additives, and they need not modify the variety of their output for this purpose either.

The use of wastes is an important inter-subsector problem. A comprehensive program for their use in the cement industry is being currently drafted. In our opinion, increasing the consumption of secondary raw materials in the cement industry to 33-35 million tons in 1985 is a feasible proposition.

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USE OF MACHINE TOOL INVENTORIES IN ELEVENTH FIVE-YEAR PLAN

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 7, Jul 82 (signed to press 13 Jul 82) pp 48-51

/Article by I. Zhitnaya, docent, candidate for the degree of doctor of economic sciences, Voroshilovgrad: "Improving the Use of Fixed Production Assets - One of the Key Tasks of the 11th Five-Year Plan"7

/Text7 In connection with the enormous accumulation of fixed production assets the question of raising their efficiency becomes a crucial task. In his report to the 26th CPSU Congress N. A. Tikhonov said, "one of the key tasks for the 11th Five-Year Plan is to more fully and efficiently make use of fixed production assets. Their growth is proceeding at a rapid pace and in many cases we are not receiving the needed return."

The data cited in Table 1 show that during the 1970's on the whole for industry fixed production assets increased 2.16-fold; and in one of the leading sectors - machinebuilding and metalworking - the increase was 2.53-fold. The growth in fixed production assets is accompanied by an improvement in their structure. The metalworking equipment park is constantly being augmented by progressive groups of machinetools - special, specialized, automated and semiautomated equipment, and numerically controlled (NC) machinetools and metalworking centers, etc. As the result of the adoption into production of the achievements of scientific-technical progress the capital-labor ratio in industry has increased 1.93-fold and in machinebuilding and metalworking this increase is 2.02-fold. This is one of the most important factors influencing the growth in labor productivity and total product output for industry on the whole amounting to 1.56-fold and 1.78-fold, respectively, and an increase of 2.04-fold and 2.56-fold in machinebuilding and metalworking respectively.

In connection with the intensive development of production labor productivity must grow rapidly as compared with its capital-labor ratio, which is a mandatory condition for raising the output-capital ratio and reducing the capital-output ratio. At the same time in comparing the growth rates of the capital-labor ratio and labor productivity in the years 1970 through 1980, one can detect a reverse tendency. On the

whole for industry in the 9th Five-Year Plan each one percent increase in the capital-labor ratio was gained through a .81 percent increase in labor productivity. In the 10th Five-Year Plan this indicator fell to .30 percent. In the machinebuilding and metalworking sector in the 9th Five-Year Plan this figure was 1.24 percent; however, in the years 1976 through 1980 the growth in labor productivity per one percent growth in the capital-labor ratio was only .87 percent.

Table 1: Dynamics of fixed indicators of USSR industry for the years 1971 through 1980 \* (as a percentage of 1970)

Indicators	Years					
	1975	1976	1977	1978	1979	1980
Fixed production assets						
all industry	151	163	175	188	202	216
machinebuilding and metalworking	161	179	195	214	232	253
Capital-labor ratio						
all industry	142	152	161	171	182	193
machinebuilding and metalworking	141	151	164	176	189	202
Labor productivity						
all industry	134	138	144	149	152	156
machinebuilding and metalworking	151	162	173	184	194	204
Amount of gross product						
all industry	143	150	159	166	172	178
machinebuilding and metalworking	173	189	206	224	241	256

\* Compiled from data: Narodnoye khozyaystvo SSSR v 1980 godu. Statisticheskiy ezhegodnik, Moscow. Statistika, 1981, pp 127, 136, 141 and 144.

During the 1970's for industry on the whole the amount of product grew by 78 percent, while fixed assets grew by 116 percent. Subsequently, the return on capital fell by 17.6 percent. For this same time period in the machinebuilding and metalworking sector the return on capital increased by 1.18 percent, but at the same time in the machinebuilding sector there was a slowdown in the growth of the return on capital and at some enterprises the return on capital exceeded its reduction.

On the whole for industry shifts in the placement of production forces often influenced the reduction in the return on capital. This was accompanied by the industrial assimilation of new regions of the Soviet Union in the eastern and northern areas. The rise in cost of fixed assets also had a substantial influence. Thus, during the 1970's the



per-unit cost of metalworking equipment increased by 89 percent on the average. The cost of progressive groups of machinetools, particularly revolving automatic and semiautomatic tools, more than doubled. Research has demonstrated that for enterprises of the machinetool sector of the UkSSR the rise in cost of fixed assets of one percent leads to a reduction in the return on capital of .6 percent. Along with this the drop in the return on capital in several sectors is the result of shortcomings in the organization, planning and management of production.

Our analysis of the use of fixed assets by five-year plan by the machinebuilding enterprises and associations of the Donetsk Basin has shown that not enough attention is given to raising the return on capital. During the years of the 10th Five-Year Plan the fixed assets increased by 42 percent on the average, the capital-labor ratio by 40 percent, and the return on capital fell overall. One the main reasons for the drop in the return on capital is the worsening in the use of equipment. Data from a one-time study of metalworking equipment, which was done by the USSR Central Statistical Administration in 1975 and 1980 (See Table 2), provide evidence of the worsening in the extensive use of all kinds of equipment, with the exception of casting equipment.

Table 2. The machine shift coefficient of metalworking equipment in primary production

Type of equipment	Shift coefficient	
	1975	1980
Metalcutting machine tools	1.45	1.39
Forge and press machines	1.57	1.49
Casting equipment	1.76	1.83
Electrowelding machines	1.56	1.49

In the auxiliary production the shift coefficient of metalworking equipment dropped during the years of the five-year plan from 1.3 to 1.21. The expensive NC machine tools and heavy and unique equipment were not fully utilized. Thus, the shift coefficient of NC machine tools is 1.46, metalworking centers - 1.61, and heavy and unique equipment - 1.31. In basic production for various reasons 16 percent of the metalworking equipment is not being used. The drop in the shift coefficient can be partially explained by a shortage of labor resources in the Soviet Union. Inadequate manning is the basic reason for 24-hour and full-shift stand-downs. Based upon the enterprises that were studied, 16.3 percent of the installed equipment was not used within a 24-hour period. Day-long equipment stand-downs at 24.4 percent of these enterprises were caused by inadequate manning. For this reason, chiefly metal-cutting machine tools are idled at the Voroshilovgrad-teplovoz [Voroshilovgrad locomotive building] Association (28 percent

of all non-operating machine tools), at the Northern Donetsk Instrument Building Association "Impul's" (36 percent), and at the Krasnodonsk automotive spare parts plant (52 percent). Moreover for industry on the whole nearly 50 percent of all workers are engaged in auxiliary, primarily manual work; in recent times there has even been an increase in this trend, particularly in repair work and in adjusting equipment and producing tools. Thus, in the machine tool building and tool making industry in 1975 some 45.2 percent of all workers were engaged in auxiliary work, including five percent in the tool shops and 4.8 percent in the repair shops; in 1978 these figures were 47.3, 5.8 and 5.3 percent, respectively. The percentage of workers engaged in manual labor in basic production is great. For example, manual labor outlays for the manufacture of the IA240 machine tool at the Kiev automated machine tool plant are 44 percent; and for the machine tools models 6520 and 6520F3 at the L'vov milling machine tool plant the figures are 47.5 and 52.6 percent, respectively. All of this demonstrates the significant reserves of labor resources, the use of which depends largely upon the pace of mechanization and automation of manual labor in industry.

The research has demonstrated that the second reason for the drop in the return on capital is malfunctions and unscheduled maintenance of equipment. For NC machine tools this is the primary reason for the stand-downs. Intershift stand-downs over the past ten years have remained almost constant, representing 9 to 14 percent of the time worked fund. The sharp increase in stand-downs can be attributed to malfunctions, unscheduled repairs, the adjusting and finetuning of equipment; in other words there has been an increase in the weighting of machine reliability and the quality of the repair and maintenance. At the enterprises which were studied the unscheduled repairs, the adjusting and finetuning of equipment alone account for 42.5 percent of all intershift stand-downs; the lack of procurements and materials, production assignments and tools account for another 41 percent of the stand-downs.

The design of metalworking equipment has become significantly more complicated. As a result there has been an increase in the likelihood of breakdowns, which are more difficult to detect and to eliminate. Organizational forms of repair and maintenance are lagging behind technical progress. Thus, for example, the time and bonus pay system for repairmen does not stimulate an increase in labor productivity or the quality of repairs. In fact, the system creates a discernible disruption both in labor productivity and in pay between the basic production workers and the carpenters and repairmen. This is resulting in a large turnover of repairmen and is the primary reason for the fact that they do not have an adequate skill level.

Improving the repair work and pay of repairmen is an effective trend in reducing intershift stand-downs of equipment. At machinebuilding enterprises at present comprehensive brigades of repairmen are being created with a standard pay scale. Such brigades have been created,

for example, in several shops of the Voroshilovgradteplovoy Association. Several worker bonus and awards systems are envisaged to motivate the workers to perform planned assignments on a timely and quality basis and for the lack of emergency shutdowns that can be attributed to the brigade. These systems also encourage the brigades to reduce stand-downs of equipment for planned and unscheduled repairs. As the result of the creation of such brigades there has been an increase in the quality of repairs within the association; stand-downs have decreased by 25 percent; and plan fulfillment has stabilized with a reduction in personnel turnover amounting to 9.5 percent. The organization of comprehensive brigades for equipment repair at the Voroshilovgrad coal machine building plant imeni Parkhomenko has made it possible to raise labor productivity of repairmen by 21 percent and to reduce equipment stand-downs by 15 percent. At the same time a rise in the quality of equipment maintenance and the work efficiency of the comprehensive brigades is being delayed by a shortage of spare parts. In speaking about the machinebuilding sector, N. A. Tikhonov at the 26th CPSU Congress noted, "This sector is not only called upon to produce modern equipment but also to actively encourage its efficient operation by the consumer. To do this it is necessary to take steps to radically improve its technical maintenance and manufacturer sponsored centralized repair and to more fully satisfy the enterprises' requirements for spare parts."

Scientific-technical progress is a key factor in the growth of labor productivity and in the increased efficiency of production. Under its influence the technical and organizational level of enterprises is changing. Along with this scientific-technical progress is requiring more and more not only of the professional training of personnel and the organization of maintenance but also of operational management of the use of equipment, the necessary condition for the further improvement of which is a well-regulated accounting and analysis of the use of fixed production assets. Unfortunately, up until now there has been no unified approach to keeping track of equipment stand-downs. At Khar'kov enterprises they are making extensive use of a selective moment photography method with results being compiled for an entire group of equipment. The basis for the formation of equipment in groups is the inventory card for keeping track of fixed assets. The special cards that have been devised for keeping track of fixed assets can be used for computer processing. To ensure the reliability of the data and the methodological and organizational unity of accounting a unified quarterly statistical accounting of the shift coefficient has been introduced in Leningrad. At many enterprises in Chelyabinsk Oblast they have introduced a daily (thorough) account of the operation of unique metalworking equipment and mechanized and automated flow-lines. For the automated monitoring of equipment they are using a set of special instruments and devices of the "Signal" type. At the enterprises, which have adopted a material incentive system that depends upon the extent of equipment utilization according to the experience of the Sumy machinebuilding Production Association imeni M. V. Frunze and the Novokramatorskiy machinebuilding plant imeni V.I. Lenin,

they are maintaining a daily comprehensive accounting of stand-downs, which is kept by the shift foreman himself. Every month according to the results of this primary accounting, the shop economists compile an analytic accounting of the use of fixed assets for each shop, sector and shift. However, even at those enterprises where there is a well-regulated accounting of the utilization of equipment, it still has not become the basis for operational analysis and for making management decisions. The Central Statistical Administration does not now have operational data for analyzing the utilization of fixed assets.

The use of production equipment is studied once every two years in form No 1-tp (mach) "accounting of the utilization of production (metalworking) equipment". To strengthen the role of the accounting and analysis in managing the utilization of equipment it is necessary to first make maximum use of the opportunities for switching to automatic means of monitoring, accounting and analyzing the utilization of equipment which already exist at many enterprises. Second, to ensure that there is a unified approach to keeping track of the utilization of fixed assets within an enterprise and association as well as on a sector and regional basis, it is advisable to introduce the quarterly statistical accounting according to form No 1-tp (mach).

An important task is to improve the methodology for calculating indicators for the utilization of fixed assets. At present at machinebuilding enterprises they have come up with a regulated accounting and estimate of indicators for only the extensive utilization of equipment. The accounting of the intensive utilization has become complicated. In economic literature they are proposing indicators for the intensive utilization of the means of labor, which are based upon data regarding the quantity of electric power that is consumed. However, these indicators do not make it possible to reliably judge the extent of the intensive utilization of equipment. The problem is that in machinebuilding there is a predominance of a large product list of a varied product manufactured on different kinds of equipment. This complicates the accounting of the utilization of equipment by capacity.

Along with the existing indicators of the extensive utilization of equipment, it is necessary to more extensively use an indicator, which keeps track of the correlation of the base and actual labor-intensive-ness of machinetool work by manufactured article and to more reliably reflect the influence upon the return on capital of the intensive utilization of the means of labor. This indicator can be estimated according to data in form 7-tp "account of a production association, industrial enterprise on the labor-intensiveness of a product unit" according to paragraph 13.



Both in machinebuilding and in industry on the whole there are large reserves for increasing the return on capital. The realization of these reserves depends largely upon the expeditious solution of organizational problems based upon a well-regulated accounting and analysis of extensive (by time) and intensive (by capacity) use of fixed production assets.

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## METAL-CUTTING AND METAL-FORMING MACHINE TOOLS

### USE OF METAL IN MACHINE TOOL BUILDING DISCUSSED

Moscow MATERIAL'NO-TEKHNICHESKOYE SNABZHENIYE in Russian No 7, Jul 82 (signed to press 18 Jun 82) pp 37-39

Article by M. Prozorovich, deputy chief, Machine Building Administration, USSR Gossnab: "Metal-Intensiveness of Machine-Building Production"<sup>7</sup>

[Text] The 11th Five-Year Plan provides for increasing the output of machinery and equipment nearly 32 percent but increasing the supply of metal as well as of metal components for their production only 6.5 percent. At the expense of what factors will this task be accomplished?

For the last few years in machine building the metal utilization coefficient has not been increasing: it remains at the fairly low level of 0.73. This means that 27 percent of metal turns into waste metal during the production process, with part of that scrap being recovered for remelting. But if it is considered that this 27 percent is equivalent to some 14 million tons annually, the struggle to increase the metal utilization coefficient clearly is very important. Suffice it to mention that the metal wasted in the form of chips over a year suffices to build one million machine tools.

Among the chief machine-building ministries it is the enterprises of the Ministry of Machinetool and Instrumentmaking Industry that display the lowest metal utilization coefficient. In 1980 it had averaged 0.595 for these enterprises. For comparison, consider that the metal utilization coefficient for the Ministry of Heavy and Transport Machine Building was 0.786; for the Ministry of Automotive Industry, 0.683; and for the Ministry of Chemical and Petroleum Machine Building, 0.693. During the 11th Five-Year Plan period it is expected that, for machine building as a whole, this coefficient will be increased to 0.78-0.79, which is tantamount to saving more than 2 million tons annually.

How then can this task be accomplished? Consider, for example, the Ministry of Machinetool and Toolmaking Industry. For the 11th Five-Year Plan this ministry was assigned the target of saving 21 percent, or 274,000 tons, of ferrous rolled stock and attaining a metal utilization coefficient of at least 0.67 by 1985.

To implement a systemic comprehensive approach to the accomplishment of this target, the subsector has developed and confirmed a targeted program for an efficient utilization of material resources. This program includes measures to save metal and increase the metal utilization coefficient, which provide for reducing the metal-intensiveness of machine-tool and machinery components, introducing waste-reducing technology--chiefly in casting, pressforging and welding types of production; and using shaped, high-precision, and economical rolled sections and components manufactured from metal powders.

At the enterprises of the Minstankoprom [Ministry of Machinetool and Toolmaking Industry] ferrous metals account for nearly 98 percent--and ferrous rolled stock, for more than 40 percent--of all the metal consumed for manufacturing purposes. What then is the reason for the low metal utilization coefficient at that ministry?

Production at the Minstankoprom's enterprises is basically of the small-series kind, but they also include enterprises engaging in regular- and even large-series production (for example, certain toolmaking enterprises). This is associated with the underdevelopment of product, component, and technological specialization within that subsector, with the exception of the preparatory types of production (castings, forgings, die castings, weldments).

The metalworking and woodworking equipment built by that subsector is characterized by complex kinematic chains, with the number of the components of certain metal-cutting machine tools reaching 10,000-15,000.

Given the small-series nature of that production, the annual consumption of specific type-sizes of metal products at the plants averages 5-10 tons and in isolated instances as little as several tens of kilograms. Hence, most components are machined by cutting shaped stock. The complexity of the configuration of components such as multiple-ring gears, multi-stepped shafts, spindles, etc. accounts for a metal utilization factor of not more than 0.35-0.45.

The loadbearing base elements are in most cases made from castings. Conversion from the casting of these elements to the use of weldments would make it possible to increase the metal utilization coefficient to 0.8-0.82, that is, the net weight of the products would decrease 20 percent and the weight of blanks, 30 percent. For example, at the "Red Proletarian" Machinetool Production Association the frame of a 16K20 lathe weighs 1,400 kg in the cast version and 580 kg in the weldment version. It is worth noting in this connection that comparison tests of hardness, vibration resistance and buckling also point to the superiority of the weldment version.

In machine building, base elements account for 70-80 percent of the total weight of a machine. It thus ensues that the conversion from casting to the use of weldments with regard to, for example, metal-cutting machine tools, will increase the metal utilization coefficient to 0.7.

The average Minstankoprom enterprise uses 150 to 350 different type-sizes of ferrous rolled stock for its production. On the average, every type-size of rolled stock is used to manufacture from 4 to 15 machine components. In this connection, the designed size (diameter) of blanks does not always coincide with the "applicable restricted (normal) size range."

The resulting excessive machining tolerances reduce the metal utilization coefficient and increase the labor-intensiveness of machining. The narrower the applicable size range at a plant is, the more this affects the metal utilization coefficient. Broadening the applicable size range, on the other hand, is difficult in view of the restricted variety of output of metal products and rolled stock at the supplier enterprises of the USSR Gosstab and the limited possibilities for ordering shipments considering that the weight norm for the average shipment is 64 tons.

The obvious conclusion is that increasing the metal utilization coefficient hinges directly on broadening the variety of metal output at the supplier enterprises, and that an increase of 15-20 percent in that coefficient would then be possible. Can this problem be solved? Yes, as shown by experience.

To satisfy more fully and rationally the demand of the Minstankoprom's enterprises for the necessary variety of metal products, the USSR Gossnab has complemented the standard forms of supply by organizing special bases for additional grading and sorting of metal products. These bases are provided with materials by reducing the carryover inventories at supplier enterprises. Experience in operating such bases in Moscow, Leningrad, Minsk and Kiev has demonstrated that such a form of supply serves to uncover latent potential and improve supplies to users without increasing the quantities of the materials themselves.

For more than 5 years now the sorting and grading base of the Leningrad Main Territorial Administration has been successfully operating under the Leningrad Machinetoal Association imeni Ya. M. Sverdlov. At first it had served eight enterprises, but now it serves 13. Initially, the variety of metal products provided to these enterprises totaled about 200, whereas now it totals 450.

Since 1976 this base has been supplying the subsector plants of the Minstankoprom with blanks instead of commercial rolled stock, by handling the optimal sectioning and cutting of rolled stock, which yields considerable savings of metal. This form of the supply of metal products will continue to be expanded. This year additional bases of this kind will be organized by the Lithuanian SSR Gossnab--at the Vilnius "Zhal'giris" Machinetoal Plant, as well as within the Odessa Main Territorial Administration, at the Odessa Precision Machinetoal Plant imeni 25th CPSU Congress, and within the North Caucasian Main Territorial Administration, at the Azov Production Association for the Manufacture of Pressforging Equipment.

As revealed by inspections performed at the enterprises of the Minstankoprom, a considerable potential for saving metal exists within the subsector. But this potential is not being utilized owing to the inadequate introduction of progressive technological processes and shortcomings in the organization of norms and standards. At certain enterprises the storage of metal is handled improperly and there exist instances of squandering of metal and its use for purposes other than for which it is destined.

The targeted comprehensive subsector program for increasing the effectiveness of utilization of material, fuel, and energy resources assigns tasks to all all-Union industrial associations as regards 22 types of resources. The tasks for reducing weight parameters pertain to 274 types of the most metal-intensive series production, whose output program for 1985 will amount to approximately 70,000 units.

Reducing the waste and losses of metal and increasing the metal utilization coefficient depend largely on the structure of the blanks used and the progressiveness of their production technology. The targeted comprehensive program provides for carrying out a considerable volume of work to elevate the technological level of the production of blanks and introduce low-waste technologies.



Plans exist to increase the use of low-waste technological processes by producing castings from high-strength iron as well as investment-pattern castings and by using molds and mold cores produced by the hot process. In addition, pressure-die castings, electroslag castings, and castings produced by the continuous method will be made. These measures should yield savings of 12,000 tons of metal, more than 25,000 tons of coke, and other materials.

In pressforging operations, plans exist to use new progressive pressforging equipment; convert from free forging to hot-die forging and forging with horizontal-forging machines; and introduce the technological operations of sizing, chasing, pre-shaping prior to final bulk die forging, precision cutting, etc. All this will serve to save more than 34,000 tons of ferrous rolled stock and more than 24,000 tons of steel ingots.

Material-saving techniques in welding operations also have been determined. A special chapter [of the program] specifies the task for expanding the variety of roll-formed, pressed, and shaped high-precision sections. The targeted program also provides for expanding the use of plastics and powder-metallurgical components. The implementation of the basic measures will yield savings of 173,500 tons of iron and steel castings and 148,500 tons of ferrous rolled stock. The thus saved quantities of metal could be used during the 11th Five-Year Plan period to build 120,000 lathes or 29,000 pressforging machines of average weight.

The planned program will be implemented if the leading machine-building subsector is assisted in all ways by the subsectors represented by the suppliers of raw and other materials, and primarily by the iron and steel plants. This is all the more necessary considering that these plants still have to resort to impractical replacements of type-sizes of metal products. This results in a considerable excess consumption of ferrous metals.

Machine tool builders have justified complaints about suppliers of accessories. As noted previously, most components of the kinematic chain in metalworking equipment are manufactured from ferrous rolled stock. It is thus of tremendous importance to convert from traditional mechanical (helical, rack-and-pinion) gearings to their electrical direct-current counterparts, particularly high-momentum engines, thrivistor drives. The use of such electrical equipment serves to preclude intricate sub-assemblies containing the largest number of shafts, gears, bushings, and other components with a low metal utilization factor. Theory and practice show that the use of such accessories serves to reduce the consumption of ferrous rolled stock up to 30 percent. Unfortunately, however, the enterprises of the Mineletrotekhprom [Ministry of Electrotechnical Industry] do not provide machine tool builders with electrical equipment in the necessary quantity and variety.

The implementation of the tasks facing machine building as regards the material-intensiveness of production and an efficient consumption of metal largely hinges on the progressiveness of technological processes and the structure and composition of the pool of metalworking equipment. That is why the machinetool and toolmaking industry strives to increase the output of equipment for low-waste technological processes. All this will contribute to the further conservation of material resources in the national economy.

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## AUTOMATED LINES AND AGGREGATED MACHINING SYSTEMS

### MACHINE-BUILDING PLANT BOASTS PROGRESS WITH AUTOMATED CONTROL

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 82 p 11

[Article by Petr Sergeyevich Kulagin, director, Barnaul Machine Tool Building Plant: "Coalition of Creative Work Forces"]

[Excerpts] The team at the Barnaul Machine Tool Building Plant has gained considerable experience in intensification of production on the basis of technical progress. Plant Director Petr Sergeyevich Kulagin is presenting an article on this topic.

His entire work history is associated with this enterprise. Here in 1949 after completion of secondary technical school in mechanics he began to work as a foreman. Then he worked as a mechanic, department head and deputy chief engineer. He was elected secretary of the plant's party committee. He finished Altayskiy Polytechnical Institute without leaving his job.

P.S. Kulagin has been the plant's director since 1970. He was a delegate to the 26th CPSU Congress. He has been awarded the title "Honored Machine Builder of the RSFSR."

Over the 12 years as my job as director I have not changed my morning habit of, before the beginning of the selector meeting, visiting the shops, of acquainting myself with the situation in sections which for some reason are the cause of worry, and of learning from first-hand sources of progress in the mastery of new products and of other events in production activities. And I ask questions and they come to me with questions. Many of them concern technical progress.

I love the morning meetings with A. Kovalenko, the party bureau secretary of one of the machine shops. Here last year on account of improvement in the technology the labor intensiveness of products was reduced by 8 percent and a continuous production line was put into service for the assembly of chains.

Labor productivity immediately grew by 20 percent. I know that A. Kovalenko will share the new ideas relating to retooling which have been maturing in the shop's team, and that he will say what kind of help is required on the part of the plant's management.

Conversations with crew leaders and foremen are enriching, not at a meeting table, but in unconstrained working circumstances.

These days the main subject of all conversations is the results of the first half year of 1982 just completed. They are not bad. The plan was fulfilled by 100.2 percent with a growth in total output of 5 percent as compared with the first half of last year. A 6 percent increase is called for in the level of labor productivity in the current year; according to the data of the first half year it has risen by 7.5 percent. Let me point out that in 1981 labor productivity increased by 5.9 percent and the entire increase in production was gained on account of this factor.

However, machine tool builders are talking less about the successes and most often criticize the faults which have been committed and share their intentions for the future. What innovations will we use to improve the productivity and facilitate the work of machine tool builders?

#### With Sights on the Future

The plant's experience has convinced us that success on the front of technical progress depends to a great extent on longterm planning of development of the enterprise as a whole. The 5-year program for retooling was designed by taking into account quotas for the mastery of new products and growth in labor productivity. And we always keep our sights on output of the planned amount and the required quality of products without increasing the number of machine tool builders.

Each shop has its own plan for modernizing equipment, increasing capacities, reducing the labor intensiveness of products and introducing industrial engineering. Cards containing calculation data are filled out for all measures. The cards are sent to the new equipment department, which sums up the anticipated improvement in efficiency and supervises the design of specific innovations. At the center of attention is the creation of totally automated production processes and the development of an automated control system.

In the current five-year plan period the plant's team is to increase total production by 40 percent, including twofold for consumer goods.

Among our products are metalworking machine tools, as well as different kinds of products intended for leading industries of the national economy. Not a single grain harvester will leave the assembly line with uncompleted chains, which our plant supplies. It also produces chains for coal mining complexes. In addition, we make electric telfers and hoists in large quantities.

Maintaining constant communication with consumers, we take into account their wishes and critical comments regarding the technical level and reliability of products. For example, at the beginning of the current year we made the first industrial series of the new type PR-44 chain. Here are some of its parameters: Its load capacity has been increased by 33 percent and longevity by 25 to 40 percent. As of this year an electric hoist with an improved design is being produced; it has a higher load lifting capacity and its period of service prior to major overhauling has been extended from 7 to 10 years.

Now we are beginning to write the draft of the plan for the third year of the five-year plan period. A conspicuous place in it is, being assigned to mastery of the production of special plano-milling machines. The plant's team intends to utilize the experience of counter-planning.

#### Reforming Technology

Measures associated with furnishing shops with new equipment made it possible last year to realize a labor savings of almost 400 people. This result is fairly solid for a plant of medium size like ours.

We strive consistently to improve and reform the technology. The plan for this five-year plan period as a whole calls for total mechanization of 16 sections, the introduction of 12 mechanized continuous production lines and the installation of more than 130 units of high-productivity machine tool equipment.

What is this being done for? In order to master 20 new products, to mechanize labor at hundreds of work places and to bring the percentage of products of the highest quality category up to 90.5 percent of total product output.

Solution of the problems facing us requires great creative effort from specialists and workers. In considering progress in preparation for the startup of the new continuous production line for the assembly of so-called lengths of chain for grain harvesters, we say quite justifiably, "This will be a line of the future." The latest achievements of modern machine building are embodied in its design, including in the area of automatic loading of blanks and transport of items in an oriented position between operations.

The "Sigma" ASU [automated control system] is helping in on-line planning and control of the fulfillment of production quotas and mastery of the output of new products--single-unit and small-lot. The data support for designing, production process preparation and supplying of materials and equipment is making it possible to make annually up to 20 complicated automatic rotary lines consisting of 15,000 different assemblies and parts. With this the time for mastering products has been shortened by 3 to 4 months.

At the present time calculations are performed by means of the ASU for 10 areas of production management operations. Improvement of the ASU on the basis of new hardware and software has begun.

#### Taste for Innovation

I wish to stress especially that in the course of retooling a taste has been stimulated among workers and specialists for creative work in the field of technical progress. This relates particularly to a growing interest in problems of robotization.

For the time being the first few steps have been taken in this respect. A group of leading specialists has studied existing production processes and has determined the places for the installation of 25 automatic manipulators.



Five robots of various types have been added in shops in the first half year. We will put three more robots into service by the end of the year.

Not everything is clear yet, but experience is only just being acquired. Preparation is under way for creation of two lines equipped with "Universal-5" mechanical devices. One such line is in operation for machining parts for electric telfers.

Today even large enterprises are not in a position to solve successfully by themselves the entire combination of problems relating to raising the technical level of production, associated with designing and making special production process equipment, between-operation transport conveyers and other units. Our plan includes cooperation with scientific institutions with respect to a broad range of problems.

The following figures give some idea of the scale of technical progress at the enterprise. During the past 6 years 4600 suggestions of efficiency experts and 94 inventions have been used in production, which made possible a saving of 3.1 million rubles. The creative thinking of workers and specialists made it possible to save 2200 tons of metal and to reduce the labor intensiveness of products by 151,900 units of rated output per man-hour.

It would not be correct to give the impression that everything is going smoothly at the plant, that plans are always successful and that there are no failures. The percentage of machine tools with numerical program control is increasing in the equipment inventory. But we have still not learned to use them with total efficiency. Interfering with this in part is the diversity of ChPU [numerical program control] systems--they number 12. This motley group is hindering the selection and training of skilled personnel for servicing machine tools with ChPU, is complicating the writing of production process programs, etc. I think that this problem has been worrying not only Barnaul machine tool builders, but also workers at other machine building enterprises.

A few words about the supplying of materials and equipment. The plant has organized the totally automated production of collars for chains needed in massive quantities in production and agriculture. But only because our suppliers infringed their contract obligations with regard to shipping metal banding and we have been forced to make collars from sheet metal by a roundabout semi-handmade production process.

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